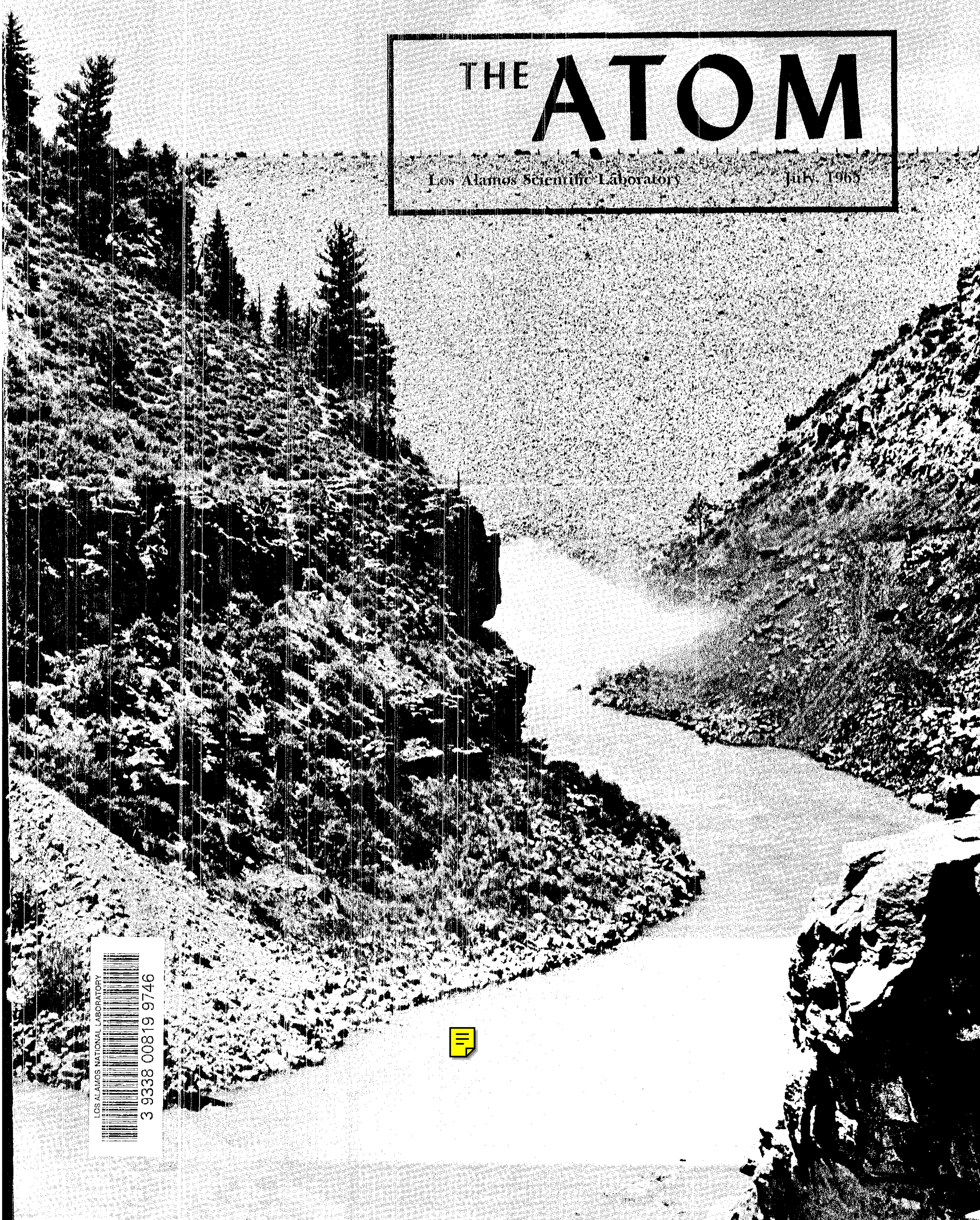
THE ATOM

Los Alamos Scientific Laboratory July, 1965



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ON THE COVER:

All that water, and in New Mexico, too!
John Young's exciting photo was taken at El Vado Dam.
The cascading water didn't linger; it was on its way
to Texas. A story on Page 7 tells about that and has some
news of interest to Los Alamos water enthusiasts, too.

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Short Subjects

The LASL Main Library, one of the largest and most complete technical reference centers in the nation, will become a "public" library on July 6. The action is one of the Laboratory's moves to extend use of its facilities to other qualified researchers as was suggested at meetings with representatives of Rocky Mountain area colleges and universities last year. Public hours will be from 8 a.m. to 5 p.m., Monday through Friday. The public entrance is via a new door and staircase at the east end of the corridor off the Administration Building lobby, by the Travel Office. The Library will continue to be available to LASL badge holders on a 7-day, 24-hour basis through the existing basement entrance, according to Alternate D-2 Group Leader Charles Machovec.

W Division Leader Harold Agnew is the new Chairman of the U.S. Army Combat Developments Command Scientific Advisory Group. He was appointed by Lieut. Gen. Dwight E. Beach, commanding officer of the CDC, to succeed Finn J. Larsen, of the Honeywell Research Center, who has become Chairman of the Army Scientific Advisory Panel. General Beach recently was promoted to full general and is commanding the Eighth Army and United Nations forces in Korea.

Senovio Lujan, 34, of El Rancho, a firing point technician for GMX-6 and LASL employe since 1951, died June 13 at an Albuquerque hospital after a lengthy illness. Survivors include his wife Gloria and sons Michael, George and Victor. Burial was in Santa Fe.

Charles A. Bankston, Jr., staff member in N-7, received his Sc.D. in Engineering from the University of New Mexico last month. Bankston, a native of Albuquerque, has been at Las Alamos since 1958. He received his B.S. and M.S. degrees in Mechanical Engineering from UNM in 1957 and 1959. He is a member of the American Society of Mechanical Engineers, Sigma Xi, Pi Tau Sigma and Phi Kappa Phi, national engineering and scholastic honorary groups.

Owners of private trailers and camping equipment that are parked on the north side of the old motor pool off Central Avenue have been instructed to move their units to a newly-designated trailer parking location on the south (Trinity Drive) side of the area. The previous parking space is to be used by Los Alamos County as an equipment yard, according to a report from the Zia Company.

Five veteran Laboratory employes retired last month. They are **Glen M. Buchanan** of SD-1, **Clarence E. Kirgan** of SD-5, **Nell F. Klemm** of AO-1, and **Howard W. Bowles** and **Glenn O. McIntire,** both of the Los Angeles Purchasing Office.

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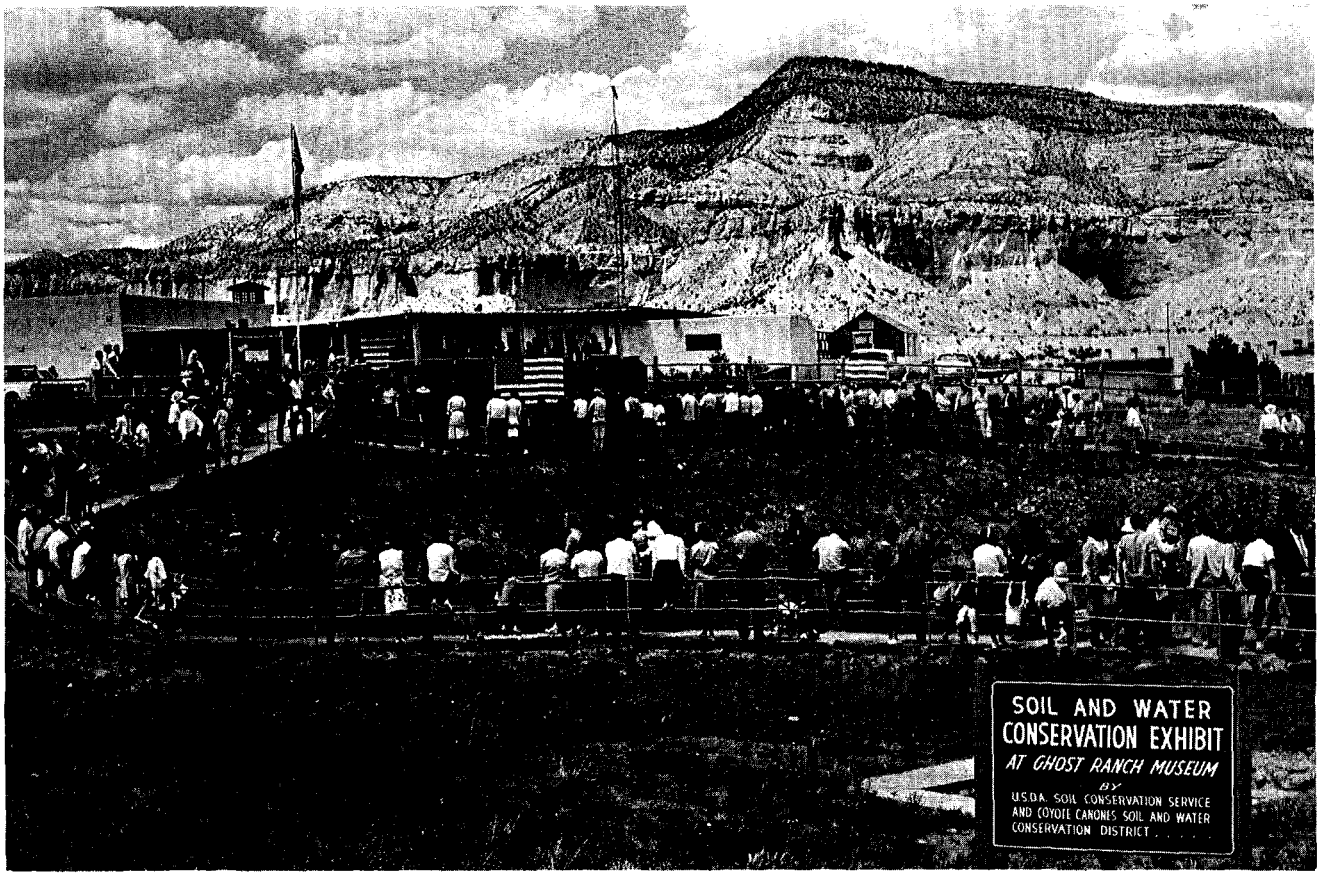


Like devotees at an outdoor temple, this long line of "sun worshippers" is part of the crowd attending Memorial Day dedication ceremonies at the opening of a new addition to Ghost Ranch Museum, above Abiquiu on the Chama Highway. The addition is a deep gully, formed by erosion, which demonstrates the damage caused by misuse of range land and how it can be restored. The Soil Conservation Service assisted the Museum in preparing the outdoor exhibit. The Museum is also the location of the tiny, but official, Beaver National Forest.

Short Subjects . . .

continued from preceding page

Stephen M. Caine, a former staff writer and editor with the Albuquerque bureau of the Associated Press, has been named editor of the Zia News, biweekly publication of the Zia Company in Los Alamos. He succeeds Richard Bradford, who resigned to return to free-lance writing in Santa Fe.

Henry C. Brockman, 66, of Madison, Wisc., who worked in the LASL Shops Departments from 1943 until 1954, was fatally wounded by an accidental shotgun blast May 17. Brockmann operated a liquor store in Madison and was cleaning the gun when it discharged.

One of the last homemade electrostatic accelerators, P Division's 2.8 mev Machine "B" Van de Graaff, was scrapped during June. Machine "B," a copy of one of the earliest such devices, was used at LASL to accelerate protons and tritons in the energy range of 500 kev to about 2.8 mev and in the intensity range from 0 to 100 microamperes. The machine was used heavily from 1953 to 1963 to conduct low-energy nuclear physics research, particularly with light isotopes. Many new isotopes were discovered, energy levels measured, and radioactive samples prepared with the device, and for many years it was the only machine of this energy with a triton (radioactive hydrogen) beam.

The AEC has reaffirmed its previously stated position that it does not intend to offer the 243 remaining Denver Steel houses for sale under the community transfer program. The mid-June announcement said these units could not be brought up to acceptable FHA standards without an exhorbitant amount of remodeling, their upkeep is a heavy drain on maintenance funds, and they are long past their life span. It is now planned to keep them as Government rental units until they can be replaced by private housing construction, and then to tear them down. The Laboratory allocation includes 85 of the Denver Steel units, and there are rarely any vacancies.

NEW HIRES

Jeremias Archuleta, Los Alamos, GMX-7 (Casual-Rehire).

Gary E. Thomas, Los Alamos, J-10.

Carolyn J. Birch, Los Alamos, P-9 (Casual).

Kent Carleton Croasdel, Los Alamos, P-9 (Casual).

Benny E. McMillan,. Albuquerque, N.M., ENG-4.

Alfred J. Ahlquist, Glendive, Montana, H-8.

Robert M. Henson, Palestine, Texas, P-17 (Rehire).

Edward W. Leach, Oceanside, N.Y. P-2.

Frederic Leo Fey, Jr., Kansas City, Mo., H-1.

Wilbur Lee Maxwell, St. Louis, Mo., SD-2.

Gerald G. Ohlsen ,Eugene, Ore., P-12 (Rehire-1 yr. Appointment).

Edward L. Williams, Sr., Clinton, Iowa, GMX-3.

Steven B. Cushing, Salt Lake City, Utah, P-11 (Rehire).

Athel L. Merts, San Diego, Calif., W-4 (Rehire).

Rose Mary Boicourt, Los Alamos, CMB-3 (Part Time-Rehire).

Deane W. Arnold, Boise, Idaho, CMB-3.

Morris West Davies, Los Alamos, CMB-AS (Casual).

John M. Lindahl, Chicago, Ill., J-6 (Rehire).

Robert L. Carpenter, St. Louis, Mo., P-14.

Frank R. Craven, a sergeant in the Protective Force and casual employe of the LASL Weather Section (H-6), has been cited by the Atomic Energy Commission for "exeptional alertness." Craven discovered a live mortar shell while on security patrol on the access road to the Mesa del Buey contaminated burial pit. The citation said Craven's immediate action to close the area until the shell could be removed "spared serious injury or possible loss of life to numerous individuals." Officials theorized the shell had gone astray during Army firings in Pajarito Canyon nearly 20 years ago.

Herbert Ungnade, chemist in GMX-2 and a New Mexico high country enthusiast, has written a book, "Guide to the New Mexico Mountains," that will be published this month by Sage Books of Denver, Colo. The 250-page volume will include color and black and white illustrations and more than one dozen area and detail maps. In addition to chapters concerning road, hiking and climbing trails there is information on the geology, archeology, recorded history and flora and fauna of the 75 named mountain ranges in the Land of Enchantment. The book is a companion to previous volumes Sage has published on the mountains of Colorado and Wyoming.

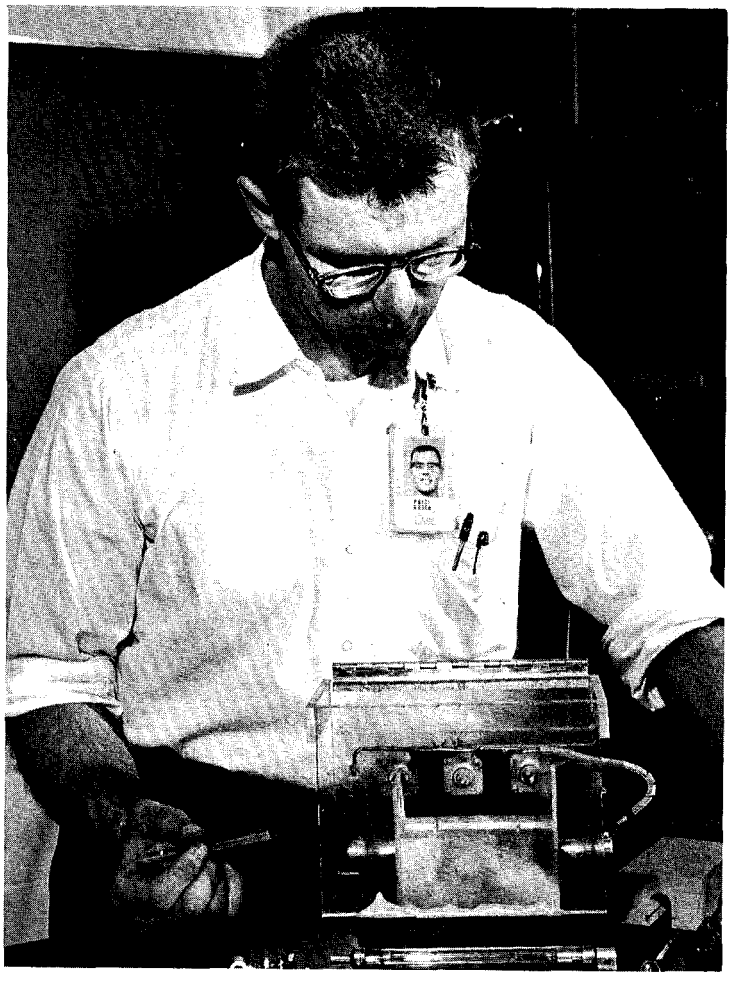
One of the largest groups ever to visit Los Alamos was here June 17. More than 250 highway commissioners, engineers and supervisors from 13 Western states came in a squadron of chartered buses for a drive-through of the community and technical areas and a lunch stop at South Mesa Cafeteria, and then went on to Bandelier National Monument. The visitors were members of the Western Association of State Highway Engineers, which was holding its annual convention in Santa Fe. Guides during the brief tour were from LASL, AEC, the Zia Company and the Chamber of Commerce.

Light Punch

Laser-Produced Plasma Held By 'Magnetic Bottle'

Photos by Mitzi Ulibarri

Ruby rod held by Roger Putzi is heart of latest scientific marvel, the laser. Device pictured is LASL laser assembly.



Two LASL scientists have used an intense beam of light to strip electrons from hydrogen and carbon atoms and have confined the resulting ionized gas, or plasma, with a magnetic "bottle."

The experiments, using the tremendous energy available from a pulsed ruby laser, were conducted by Roger Putzi and Phil Mace of J-8.

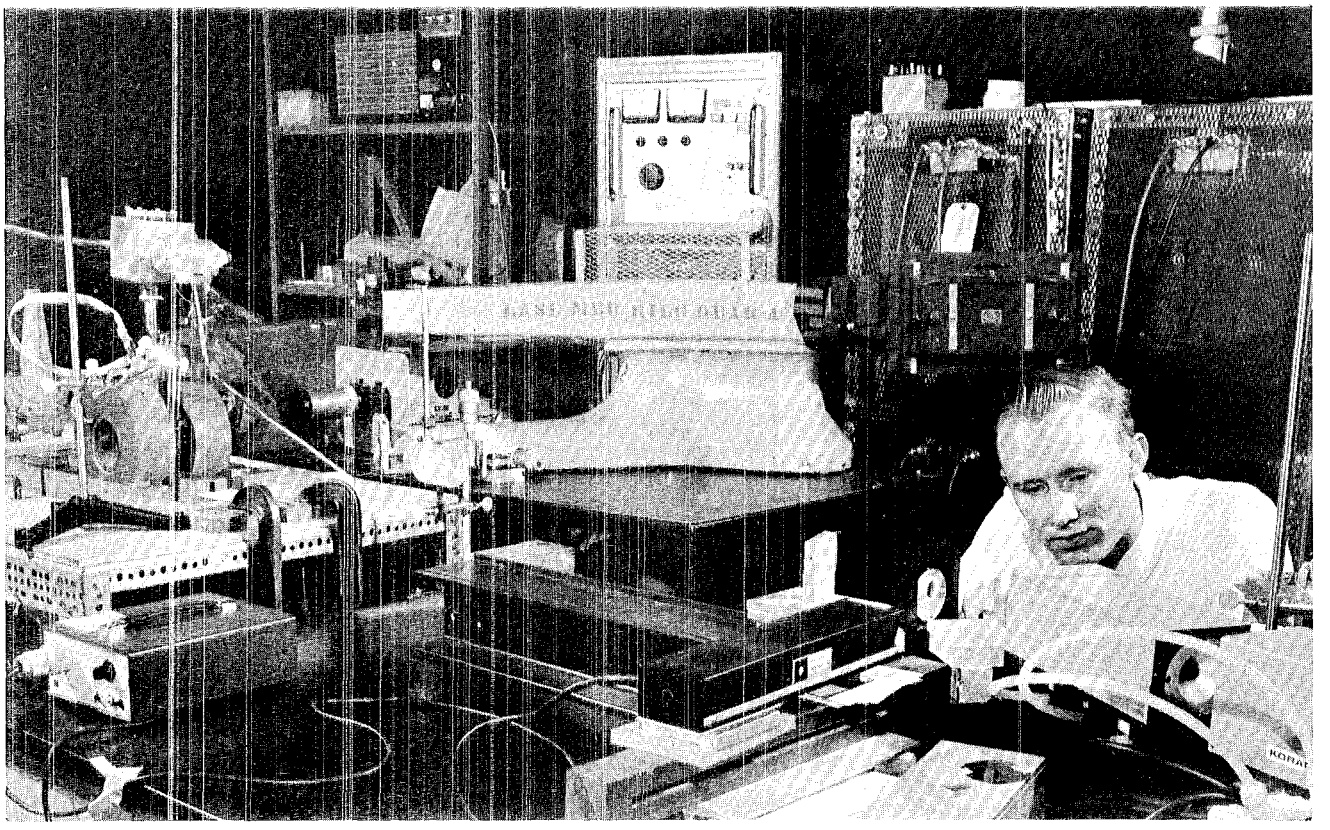
Ionization by laser light is not a LASL "first," but successful magnetic confinement of a laser-produced plasma is, and the experimenters believe further work in this area might be of great value to the fusion-for-power goals of Project Sherwood.

Ion energies of 48,000 electron volts were measured. The "temperature" of the plasma can only be approximately stated, Mace said, but a lower limit of about 60,000 degree (Kelvin) is believed to be valid. "Of greater significance," he added, "there was a temperature rise resulting from the application of the magnetic field."

The LASL experimenters made no density measurements but other laser-produced plasmas have indicated densities of 10^{19} electrons per cubic centimeter, somewhat greater than densities obtained with Sherwood devices, but the combination of density, confinement time and temperature of the plasma is short of controlled fusion requirements.

Mace and Putzi are recommending additional research, not only for the possible applications of the process to Sherwood but because of the opportunity to add to present sparse knowledge regarding the interaction of high power light with matter of relatively high density.

The experiments were conducted at the Air Force Weapons Laboratory at Kirtland Base in Albuquerque, mainly because that laboratory possesses the highest powered ruby laser in the area and Air Force scientists made the laser facility available to LASL. Except for power supplies, ap-



Phil Mace adjusts laser in experiment setup at Kirtland AFB. Intense laser light beam hit target that was placed between the two doughnut-shaped coils at left. "Anvil" in center is spectrograph that was used for analysis.

paratus for the unique work was of table-top dimensions.

Laser (*l*ight *a*mplification by *s*timulated *e*mission of *r*adiation) light is the latest miracle device of science and results from a relatively simple application of atomic and optical physics:

> Ions (atoms with electrons missing) when dropping from a high energy level to a lower level give up their energy as radiation that includes visible light.

Although a number of materials and methods have been devised for the production of laser light, most lasers are based on essentially the same processes. One of the finest substances for laser use is ruby, which contains aluminum, oxygen and a very small amount of chromium. It is the chromium which makes the ruby laser work. This is because chromium can be "excited," that is—it can absorb energy to a sort of saturation point and then release it. The energy comes off as light that gives the ruby its reddish color, a wavelength of 6943 Angstrom units (6.943×10^{-7} meters).

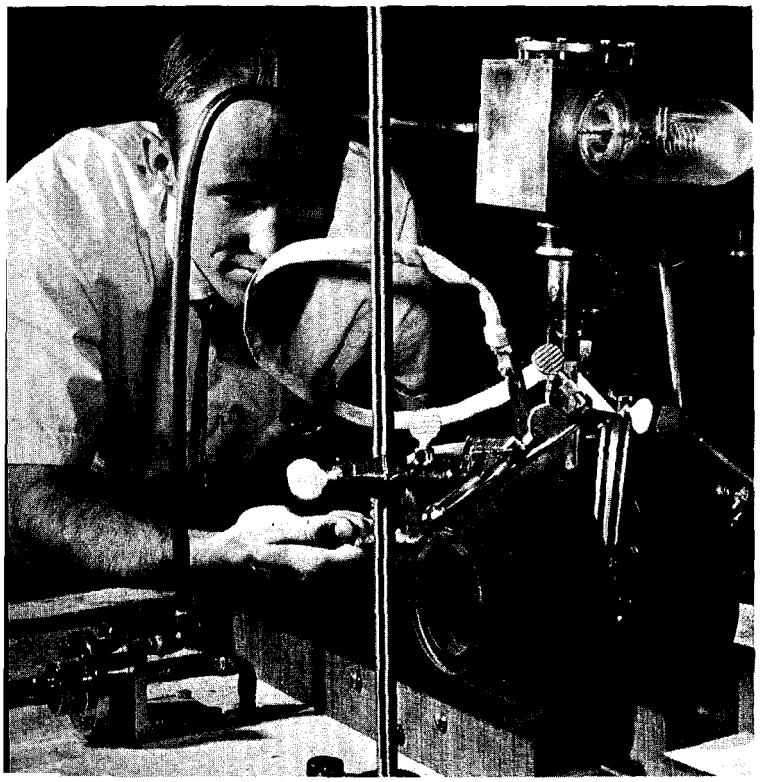
So, to make a laser "lase" one first "pumps" energy into the ruby by firing a brilliant light such as a xenon flash tube. The chromium absorbs the light energy until it can take no more and then, in effect, regurgitates, seeking its normal or ground energy level. In order to increase the intensity of the light pulse it is necessary to contain the laser energy briefly during the discharge. This can be accomplished by providing mirrors at the ends of the ruby to reflect the light back and forth. One mirror is made partially transmitting so that a portion of the light escapes at each reflection, resulting in a directional pencil-size beam of tremendous energy, with the light waves of the same frequency and in step, or "coherent."

Such laser light can be so intense that the beam will cut through steel, can be used for delicate surgery, can be directed and seen as a spot on the moon, and can even be modulated to carry messages over great distances.

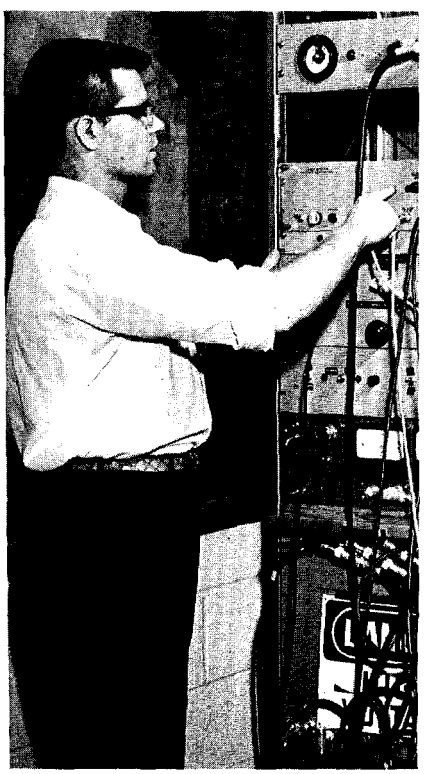
The Air Force laser used by Putzi and Mace is capable of generating a light pulse with a power of two gigawatts—that's three billion watts. The burst lasts about 20 billionths of a second.

Putzi and Mace directed the high energy beam only about five feet, to a lens that focused it to a point on a piece of polyethylene film. Polyethylene is comprised of molecules made up of hydrogen and carbon atoms. The film used in the experiments was cut from a common plastic garment bag and was suspended in a small quartz tube sandwiched between two magnetic coils. The tube was evacuated to prevent molecules of air from interfering with the reaction.

When the experiment was over



Polyethylene film in quartz tube between the two coils. After ionization, plasma was contained by magnetic fields and the temperature climbed.



Putzi triggers power supply that "pumps" ruby and creates intense laser light's pulse of high energy.

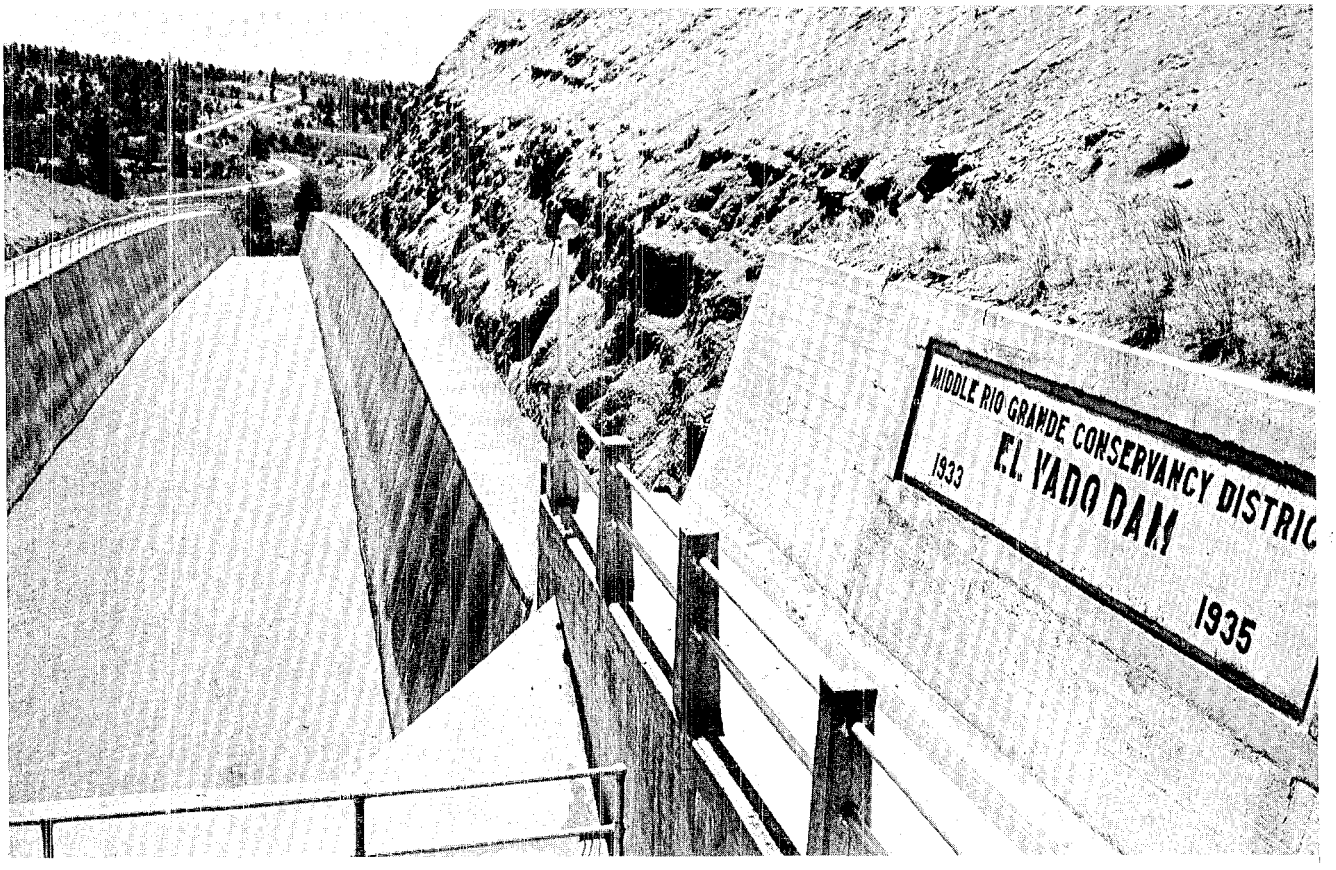
only a pinpoint hole in the film was evidence of an atomic cataclysm that in its entirety lasted probably no more than a millionth of a second. In the instant when the laser beam struck the film there was a tremendous transfer of energy, resulting in vaporization of the target bit of film, disassociation of the molecules and removal of electrons from their atomic orbits. Spectographic measurements showed that at least three of the 6 electrons in the carbon atoms were stripped away.

Simultaneous with firing of the laser, a large electrical current was passed through the coils, building up the magnetic fields. The plasma, composed of positively and negatively charged particles, was thus confined in the magnetic "bottle." The action is similar to that used in various fusion devices to increase plasma temperature, hopefully to the point where some of the wildly moving ions slam together in a true thermonuclear fusion reaction.

The Putzi-Mace experiments utilized a magnetic field of some 30,000 gauss, which is a pressure of about 1000 pounds per square inch. The scientists hope to repeat the experiments with more powerful magnetic fields, perhaps up to 100,000 gauss, and to make new and more precise measurements, including simultaneous measurements of the plasma temperature and density that result from the laser strike and magnetic implosion.

As in the earlier work, a spectograph will be used to look at temperatures. To measure electron density the quartz vacuum chamber will be placed in the active leg of a Mach-Zehnder interferometer. This device measures the change in length of an optical path that is produced by the presence of electrons. Comparison with an unaltered beam makes it possible to determine the electron density.

With their Kirtland experiments ending last month, Putzi and Mace began assembling equipment for the new series of studies, which will be done at Los Alamos with a LASL laser of lower power.



Water pours over the spillway at El Vado dam. Main road to the dam curves down in the distance. Water has been coming in faster than it can get out, but the entire lake is going to be drained by the end of the year.

OVER THE DAM

That's Where the Water Is

By Earl Zimmerman

The frequently incomprehensible procedures that govern water economics in the water-scarce Southwest have resulted in a dandy paradox on the Chama River.

Plum-full El Vado Reservoir near Tierra Amarilla must be emptied this year for some construction work. Included in the 136,000 acre-feet of water that are impounded at El Vado are 20,000 acre-feet of what amounts to permanent storage. This water, which technically is assigned for downstream irrigation use by certain Indian pueblos, has been authorized for temporary transfer some 50 miles downstream on the Chama to the Abiquiu Dam Reservoir, where it can be held and used for recreation purposes.

Only hitch is that the 20,000

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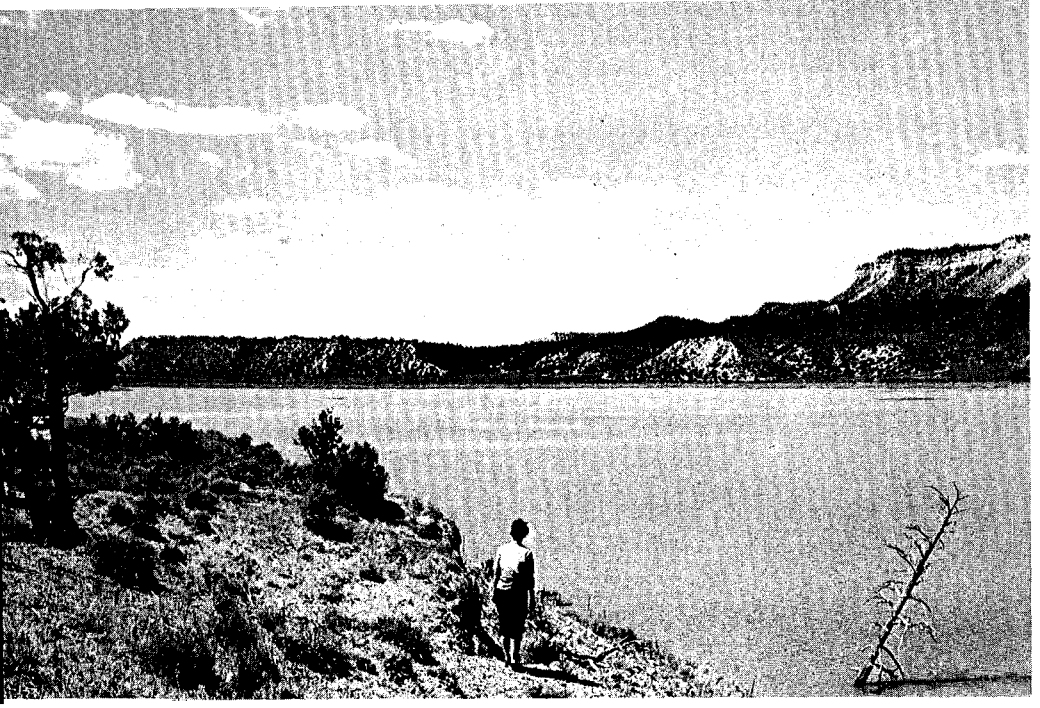


Looking across an arm of El Vado Lake toward the cliffs that form its western boundary. The lake is at high water level, but will be draining all summer.

acre-feet is, for all practical purposes, submerged beneath 116,000 acre-feet of water that belongs lock, stock and last drop to Texas and the Republic of Mexico.

Not one gallon of the Indian irrigation water can be transferred from El Vado until enough H_2O has been sent sluicing down the Chama, right through Abiquiu to the Rio Grande and on down to the Elephant Butte Reservoir to meet commitments for parceling to further downstream irrigation users.

This game of aquatic musical chairs is played according to rules set forth in a 50-year-old treaty with Mexico and in the Water Compact of 1939, documents mortgaging New Mexico's water resources for an indefinite period into the future.

Shipment of the debit water continues annually until the normal Rio Grande level is so low that in-transit water likely would be lost to uncontrollable withdrawal for irrigation in the Rio's Middle Valley. This condition usually exists by mid-summer.

A further handicap is the fact that water can't be drained any faster from El Vado. Both outlet gates are wide open and water is pouring over the spillway on top.

To hold water back earlier from the lower Rio valey in order to transfer the 20,000 acre-feet would interrupt the debit flow for about 10 days, an action sure to arouse howls of protest from the south.

The treaty and Compact contributed to a rather incredible provision in the operating manual of the $15 million Abiquiu Dam: The only water that can be held in its enormous impounding area is water that otherwise would cause flood and silting damage downstream. The reservoir MUST be emptied as soon as downstream hazard is past. This, even though the Abiquiu storage area is four times larger than that needed to contain the greatest flood ever recorded in the Chama watershed.

At El Vado the only water that is held beyond the 20,000 acre-feet is what is known as "involuntary storage," water that comes in faster than it can get out. Once held, this excess automatically becomes debit water, subject to the terms of the treaty and Compact. In most years downstream runoff drops below the safe-passage point for debit water while there is still storage at El Vado. In those circumstances the water is not sent to Elephant Butte until fall, after the irrigation season and danger of water-poaching is past. As a result, El Vado has a goodly storage pool most every summer and has become a water recreation center rivaled only recently in Northern New Mexico by completion of the huge Navajo Dam and Reservoir near Farmington.

The need to drain El Vado is because construction of the San Juan Diversion Project to the north will bring additional water into the Chama in a few years. (This additional water will belong wholly to New Mexico and some of it will be stored for recreation use at Cochiti Dam, which is to be built on the Rio Grande between Los Alamos and Albuquerque.) For El Vado to pass the San Juan Diversion water will require a larger outlet works in the foot of the dam. Construction will take at least two years.

Ironically, all this activity is coming at one of those rather rare periods when snow and rain have

Right: An unexpected bonus from the unusually heavy (and late) spring runoff on the Chama river was the creation of a recreation lake several miles long behind Abiquiu dam. This view looks up the lake from a point a little southwest of the dam. Water normally is held only for flood control.

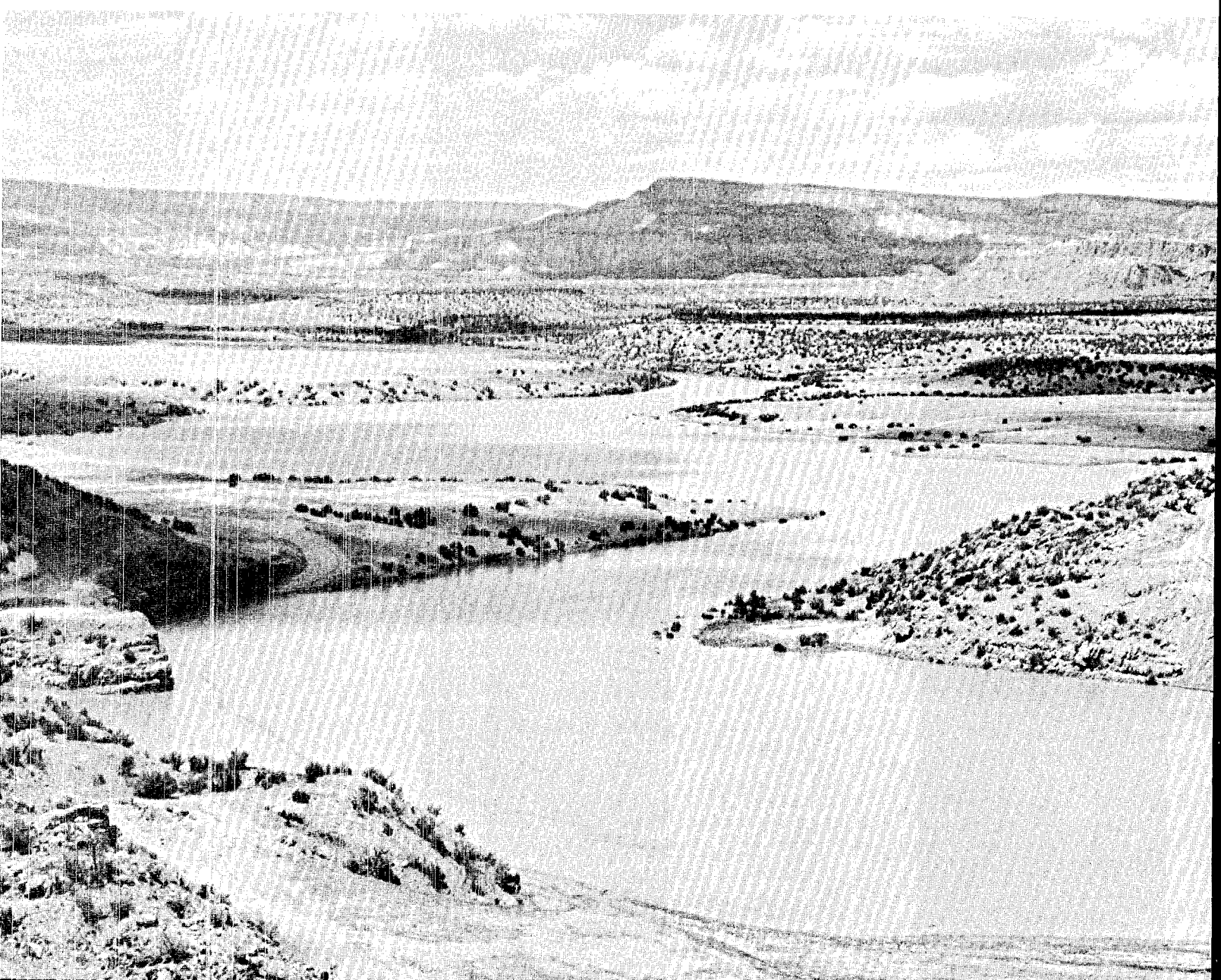
been plentiful and El Vado's cup runneth over. The drawdown at El Vado has been arranged by the Bureau of Reclamation, which operates El Vado, and the Army's Corps of Engineers, which operates Abiquiu. The transfer of the 20,000 acre-feet is expected to take all of July and most of August. Through it all there will be a steadily falling water line at El Vado and a rising pool at Abiquiu. The full 20,000 acre-feet allotment is expected to provide a lake of about 800 surface acres at Abiquiu, adequate for boating and fishing but still only a puddle compared with the 502,000 acre-feet capacity of the vast reservoir area there. An acre-foot is water sufficient to inundate one acre to a depth of one foot. If more debit water remains, it, too, will be held at Abiquiu, resulting in a larger lake.

"Lake Abiquiu" has been opened to boating on several occasions already this year, because of flood control water held there briefly. If the year continues on the wet side, Engineers said, the recreation pool could well be larger than the one created by the water from El Vado.

El Vado likely will have a sizable pool for the remainder of the summer, too, despite the drawdown. This is because of the cool spring and early summer which restricted the snow melt in the Chama River watersheds. Through most of June the inflow at El Vado exceeded the dam's outlet structure capacity, filling the reservoir to overflowing.

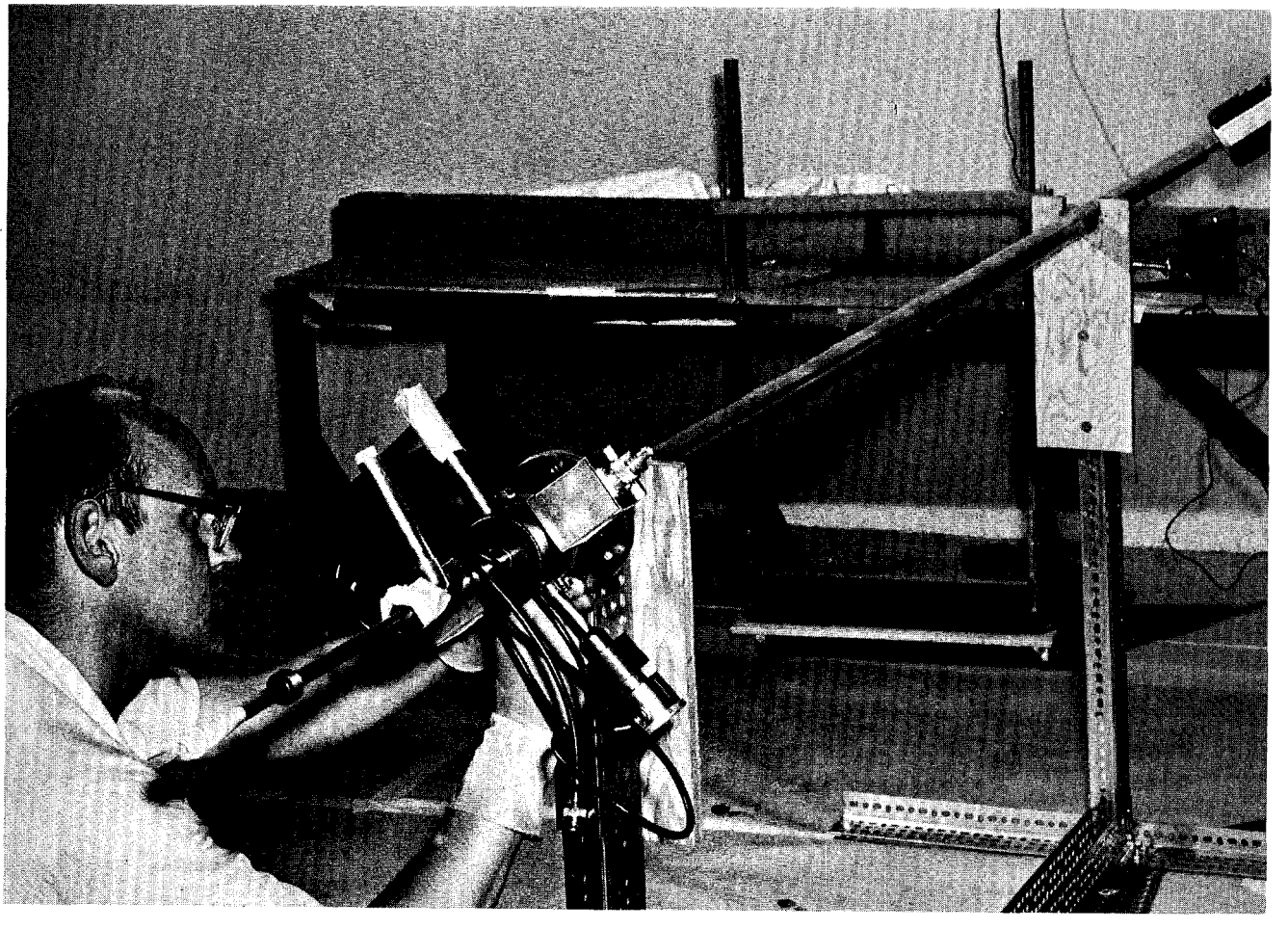
By the summer of 1966, though, unless there is another unusually wet winter and spring, El Vado will be as low as possible. Outlet gates will be kept open and the only water in the reservoir will be "involuntary storage" that can't get through the gates.

The 20,000 acre-feet belonging to the Indians will be kept at Abiquiu and everything else will be dispatched promptly, if reluctantly, to Texas and Mexico.



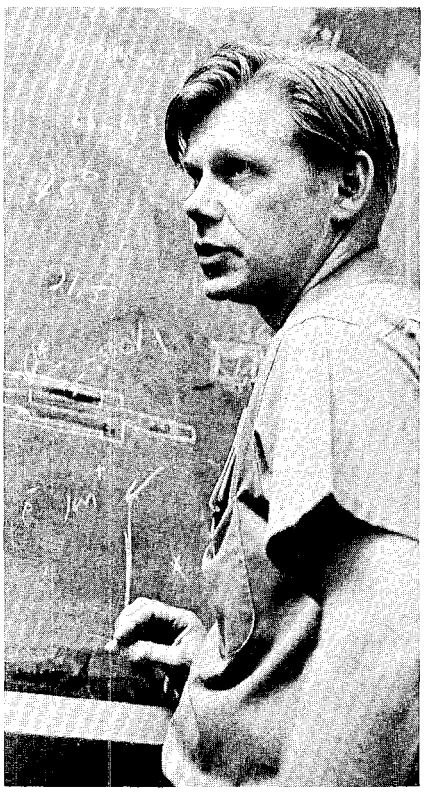
Hot Fishpole

Method Devised to Measure 'Evaporation' of Atoms



Left: Ceramic cylinder at "hot" end of experiment was lined with platinum to collect dislodged uranium atoms.

Right: "Whitey" Thorpe performs blackboard calculations during pioneering "evaporation" experiments.



A method for measuring "fission evaporation," one of the side effects of the fission process that has intrigued physicists for many years, has been developed by Peter J. Peterson of CMB-11 and Munson (Whitey) Thorpe of P-2, supervisor of the Water Boiler Reactor.

The pair has been able to count uranium atoms dislodged by blows from highly energetic fission fragments. Although conceived as an exercise in pure physics research, the Peterson-Thorpe experiments will be of practical concern, especially for the design of reactors that use unclad fuel elements.

To make the studies there was need for a device in which fission and "evaporation" could take place under controlled conditions, with means for accurate counting. The venerable Water Boiler reactor at Omega Site provided precise irradiation control, accessibility, and radiation counting facilities. Peterson, with assistance from Technician Bob Walker of CMB-11 and the fabrication techniques of CMB-6, designed and assembled the experiment apparatus. Thorpe supplied the reactor know-how for the "hot" runs, which took place in May and early June.

Opposite Page: Fishpole-like device designed to make precise measure of uranium atoms "evaporated" during fission is readied for insertion into reactor by Peter Peterson of CMB-11.

The fishpole-like experiment device was a stainless steel tube about 1½ inches in diameter and some 90 inches long. The length was necessary to extend from an access port on the reactor wall to the fuel sphere inside. At the end of the tube that went inside the reactor was a ceramic cylinder about 12 inches long, its interior lined with platinum. Various plumbing, electronic and other controls were connected through the tube to the outside. The cylinder served a dual purpose: It was an irradiation chamber during the first portion of the experiment and converted to a fission counter for the second portion.

Target of the initial neutron bombardment from the reactor was a sleeve of uranium ½-inch in diameter, 3/16-inch long and 5/1000-inch thick. The sleeve fitted over a steel rod located inside the ceramic/platinum cylinder.

During the first phase of the experiment, conducted in vacuum, the reactor was taken to 25,000 watts of power. Positioned tangent to the reactor core, the sleeve in effect was submerged in a sea of neutrons, which caused fission of the uranium nuclei. As is normal in fission, the resulting nuclear debris, or fission fragments, went whizzing off in all directions like chunks of shrapnel.

Atoms of uranium struck by these energetic fragments were knocked through the vacuum to deposit on the platinum "collector" surface of the ceramic cylinder. It is this movement of atoms that is of interest.

After an irradiation period, the sleeve was drawn back about 16 inches. Its original position in the

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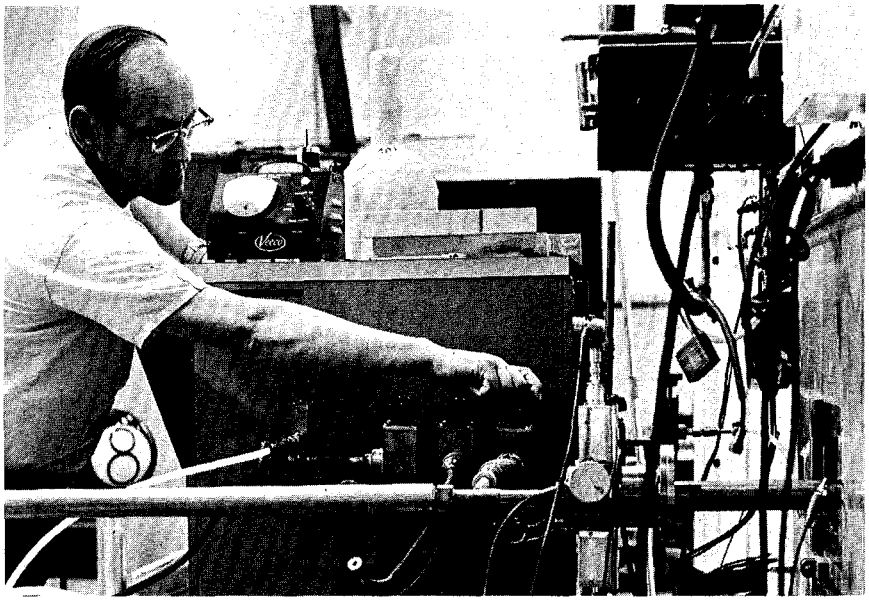
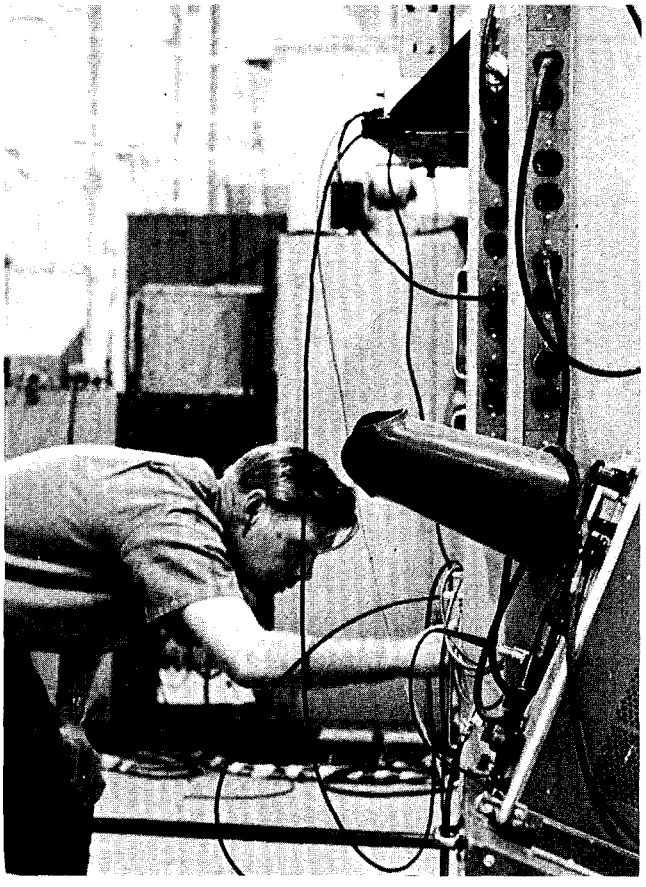


Peterson commences vacuum pumping on experiment apparatus after it was placed into core of Reactor.

Fission detectors and computer equipment are adjusted by Thorpe for preliminary analysis of data after uranium experiments at Omega Site.

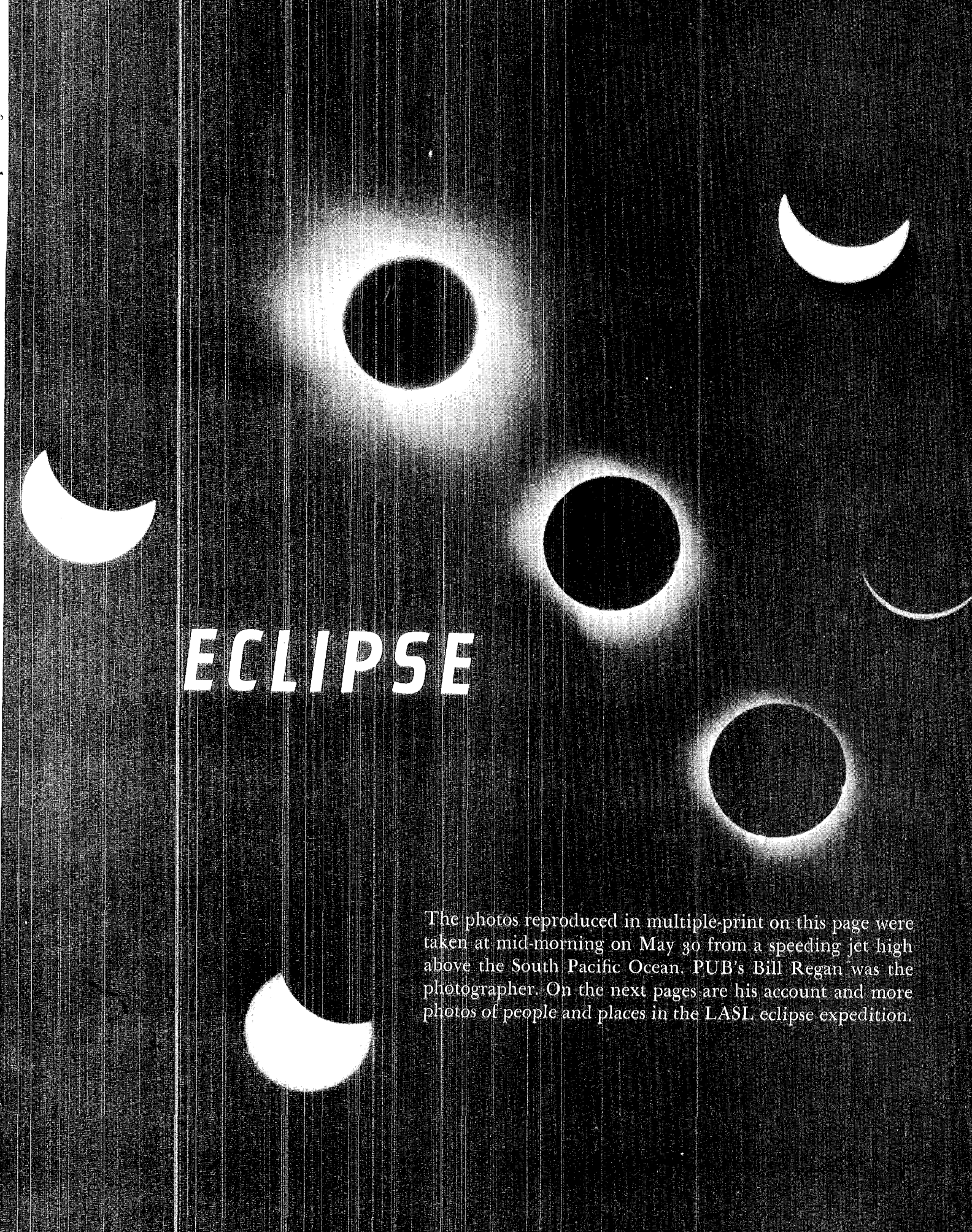


cylinder was taken by an electrode that was pushed into place by a spring compressed at the front of the tube. Soft solder gaskets on this piston arrangement renewed the tight seal. Then the small chamber was filled with counting gas, an argon-methane mixture known as P-10, and a negative potential of 500 volts was applied to the platinum.

The reactor was taken to power again, about 100 watts was sufficient, and the flux of neutrons now produced fission in the relocated uranium atoms. Nuclear fragments from this reaction caused ionization of the counter gas and the electrons thus liberated were drawn to the positively charged center electrode, producing an electrical pulse.

From the known neutron flux of the reactor and the number of electrical pulses resulting from the ionization action it thus was possible to determine the relative number of uranium atoms that "evaporated" from the sleeve and collected on the platinum.

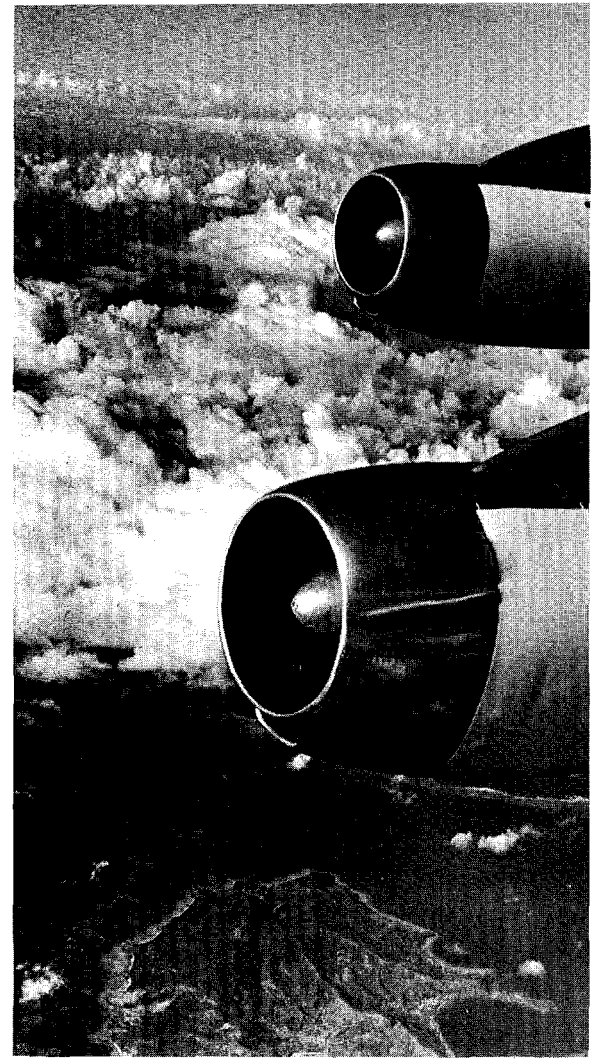
The experiments have yielded valuable information regarding the effects of fission fragments on the movement of material from the surface of the fissioning uranium.



The photos reproduced in multiple-print on this page were taken at mid-morning on May 30 from a speeding jet high above the South Pacific Ocean. PUB's Bill Regan was the photographer. On the next pages are his account and more photos of people and places in the LASL eclipse expedition.

From the spectacular night-in-the-morning wonders of a total solar eclipse, to the long winter's darkness of Antarctica, LASL's high-flying and far-ranging physicists recently returned to home base after more than 37,000 nautical miles travel and successful coronal and cosmic ray observations.

After collecting data on the flaming, visible glory of the sun's corona revealed in the May 30 eclipse 15 degrees south of the equator, the Los Alamos scientific team turned their attention to the invisible field of cosmic rays, a study which took them to a point 60 degrees south latitude only 450 miles from the south magnetic pole. Their NC 135A flying laboratory, provided by the AEC and the Air Force, flew at a constant altitude of 30,000 feet along selected lines of longitude allowing the LASL cosmic ray team of Robert Peterson, Dick Wakefield and Carlton Young, to collect data on cosmic ray intensities as a function of latitude. A team from Sandia Laboratory, Albuquerque, flew in a sister ship to the LASL jet and cooperated in both the solar and cosmic ray studies.



LASL's high flying solar eclipse experimenters got this bird's eye view of Aunuu Island, one of American Samoa's seven islands, on their arrival there last month. The solar eclipse expedition was based on Tutuila, the main island of the group.

Arthur Cox, scientific coordinator for the LASL solar eclipse team, checks aircraft position with a sun compass he designed himself.

The Los Alamos researchers are specifically interested in the secondary gamma radiation in the 10 to 250 MeV range and the low energy gamma component between 0.5 and 10 MeV. J. E. Keith of Sandia probed the cosmic ray-induced fast neutron fluxes. Both teams started data collection on the staging flight to Samoa from the United States for the eclipse expedition.

On the June 3 Australia-Antarctica leg of the expedition, readings were taken every five minutes along the 147.5 longitude line from Ava-

lon Air Base near Melbourne to the 60 degrees south latitude point and return to E. Sale RAAF Base. After a refueling stop, an additional short hop was made along the 145 degree line before return to Avalon. June 4, the LASL group flew another 2200 nautical miles to Darwin on the north coast of Australia. Leaving Darwin June 5, the cosmic ray probers flew east again to catch the 145 degree longitude line and continued their sampling on a 2800 nautical mile flight to Guam and a few hundred miles north.

From Guam, another 3600 miles landed the group in Honolulu with a short intermediate refueling stop at Johnston Island, a familiar oasis to many LASL J division people. The weary scientists with 37,000 miles flying logged since leaving Albuquerque May 21, returned to home base and a waiting crowd of families June 6 after a 3300 mile nonstop hop from Hickam Field, Honolulu.

The land-based P division instrumented rocket team of five led by Harold Argo to Rarotonga for eclipse observations of soft x-rays returned to Los Alamos June 8. Argo's group, which also collaborated with a Sandia team, was able to fire five rockets to an altitude of 200 miles. Two launches were made prior to totality, two during totality and one afterwards. Preliminary reports indicate the best data was obtained on the fifth rocket. In all cases, instrumentation worked perfectly, but some trouble was experienced with the payload orientation system.

LASL's first airborne eclipse observation team led by Arthur Cox, scientific coordinator for the expedition, was jubilant over data obtained in all experiments. Scientists gave particular credit for the high performance to precise navigation by Air Force Capt. Steve Pocsik and maintenance of aircraft stability by Major Jim Wells, aircraft commander, and Capt. William Skillman, co-pilot.

Sidney Stone directed the coronal camera experiment manned by a

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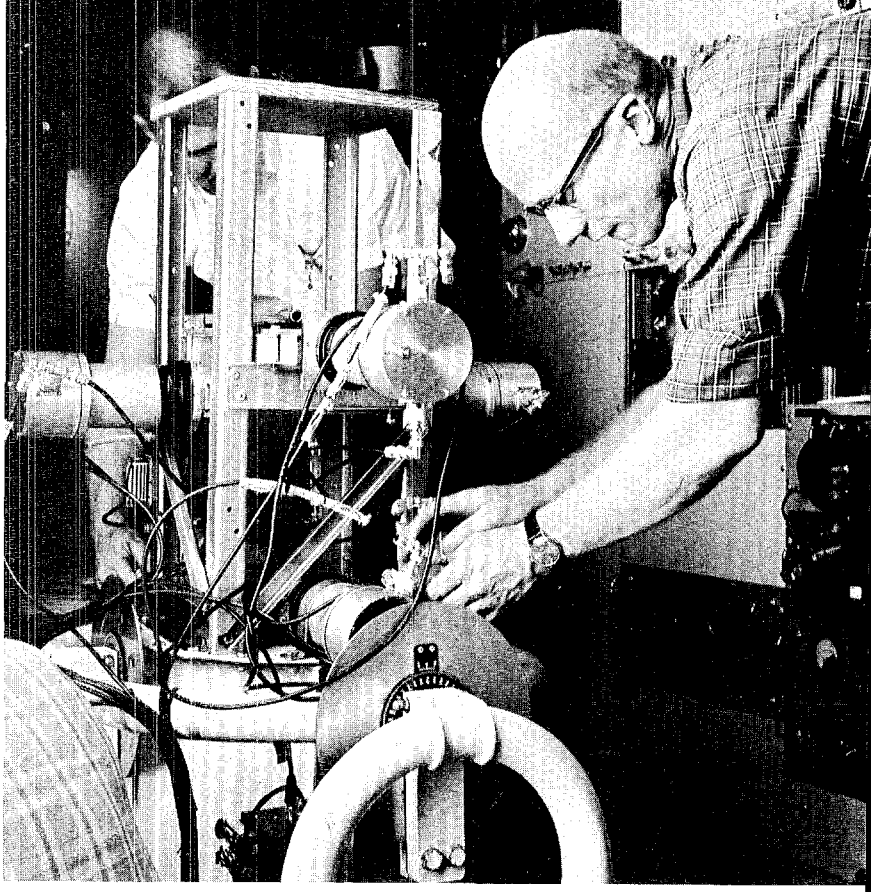
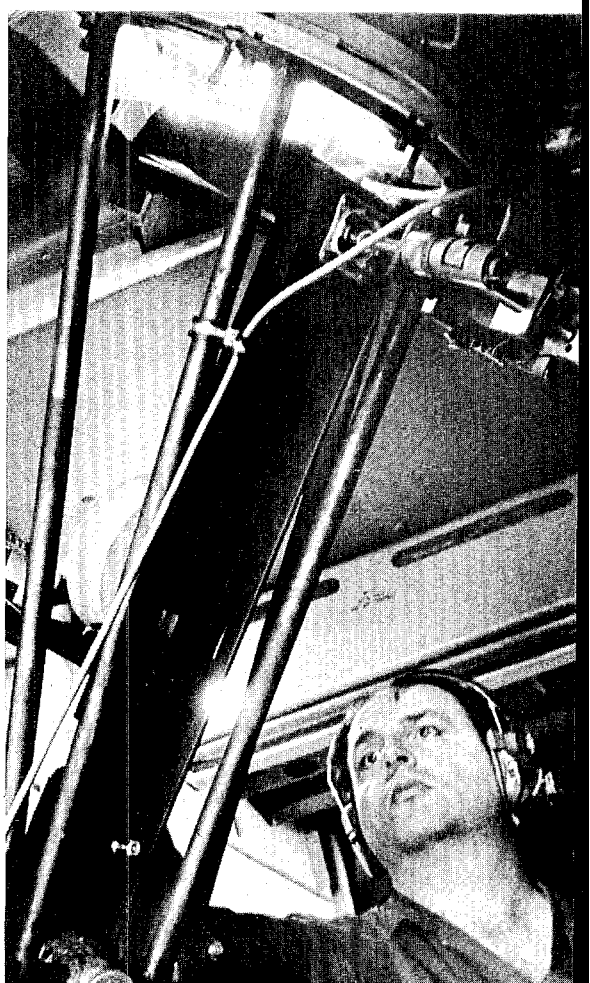


Cosmic ray experimenters Richard Wakefield, partially hidden, and Robert Peterson, both of J-16, tune up their detectors aboard the LASL NC 135 for flights south of Australia.



Charles Hyder of UCLA, makes final adjustment to polarization experiment.

Eclipse

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four-man team of Alvin Graves, Johnnie Gallegos, Harold Staake, Paul Rudnick, and Sandy Strubelis, the latter of EGG. Calibrated white light photographs out to five solar radii and pictures of the corona in the light of the 5303 Å green line of iron were obtained.

Donald Liebenberg led the "Rube Goldberg" experimental team of Kenneth Williamson, Wiliam Ogle, Walt Wolff and Paul Rudnick of LASL, and Melvin Mattison of Sandia. Ralph Partridge designed and supervised the unique automatic tracker system for both teams. The Rube Goldberg apparatus made five important measurements through an 80-inch focal length lens. Detailed photometery, using a rotating filter wheel, of coronal continum and six emission lines was carried out. Interferometric observations of the shape of two iron emission lines and one photospheric absorption line were also made. In addition, a photograph was obtained of the interferometer fringe pattern of the iron 5303 line to one solar radius. Data tape records were made of all systems by Larry Gillett of Sandia.

Also aboard the LASL aircraft for the solar eclipse flight was Charles Hyder and his assistant, Jerg Jergenson, of the UCLA Astronomy Department. They made polarization measurements of the 5303 green emission line of iron, a joint experiment of UCLA and the High Altitude Observatory of Boulder, Colo.

Although many of the scientific crew were unable to view the eclipse, those who did described it as a "magnificently beautiful, awe-inspiring sight." Excitement mounted from the moment of first contact when just a small nick appeared on the edge of the sun's blinding disc. For more than an hour, the moon nibbled away at the earth's sun while the flying laboratory was forced to climb to more than

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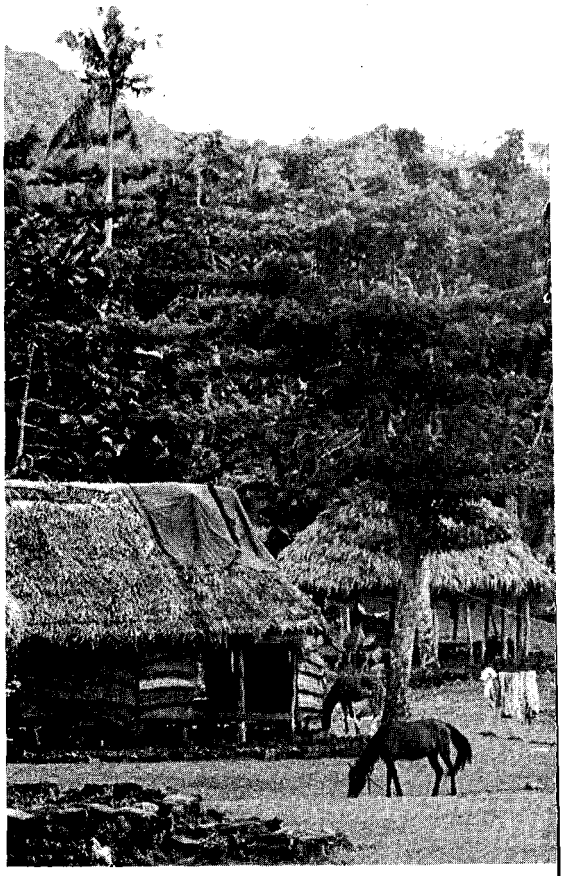
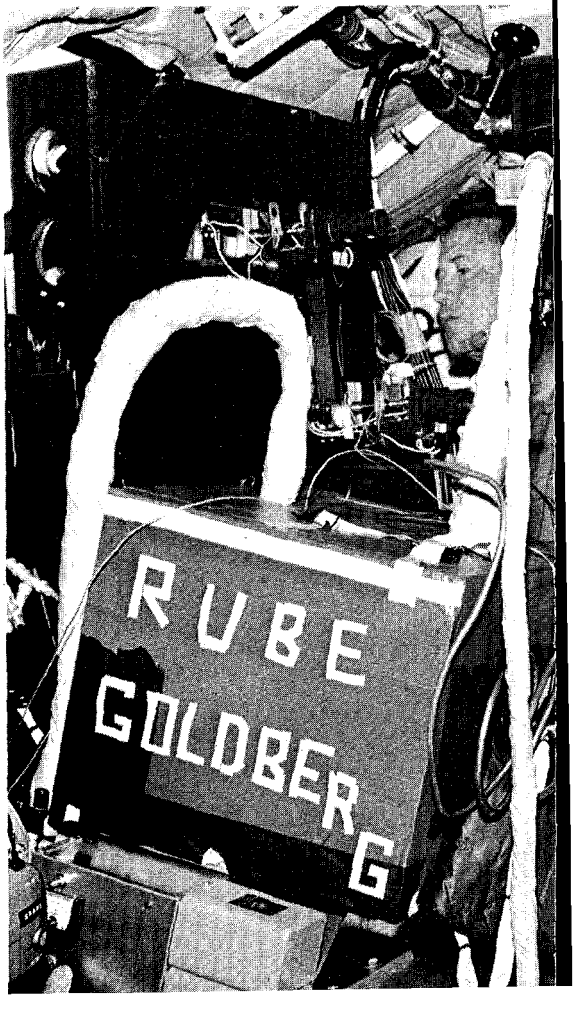
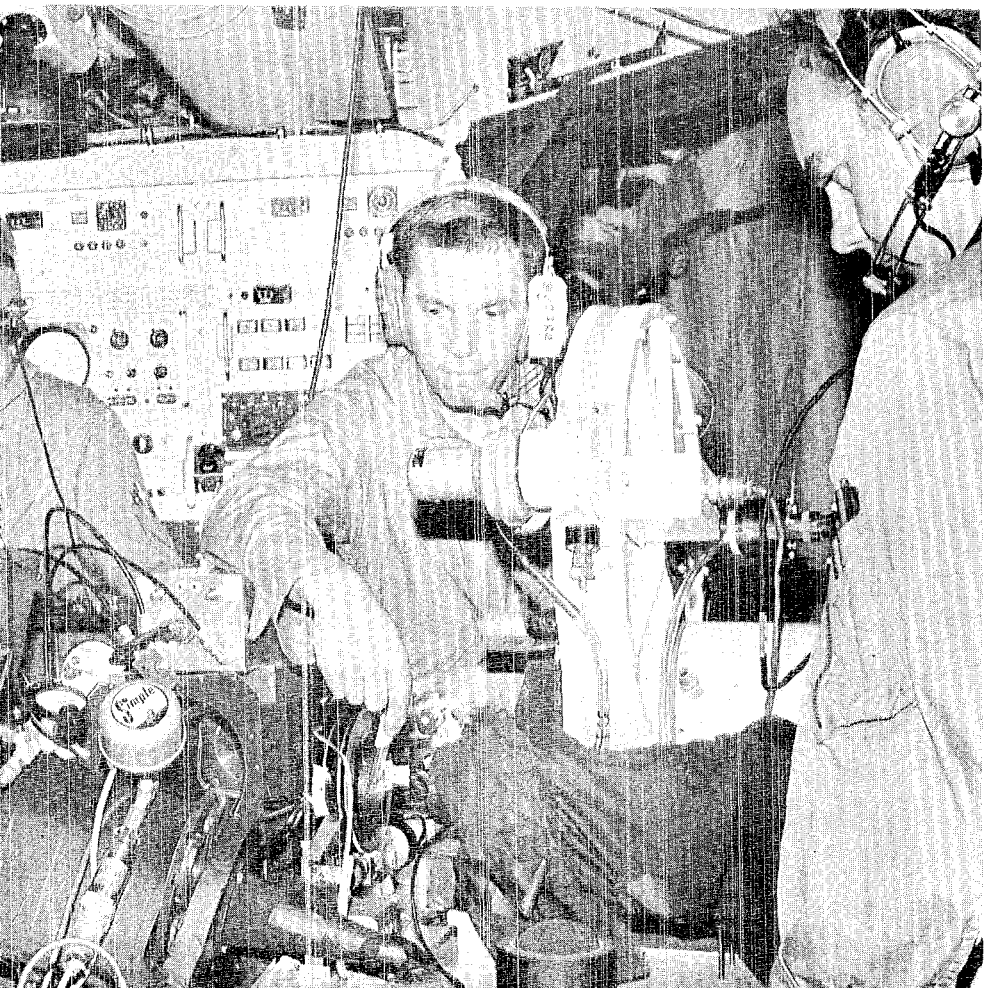


Right: These palm thatched fales are typical of the Samoan villages which dot the 76 square mile island of Tutuila. Samoa is one of the few remaining Polynesian societies which has preserved a major part of its heritage.

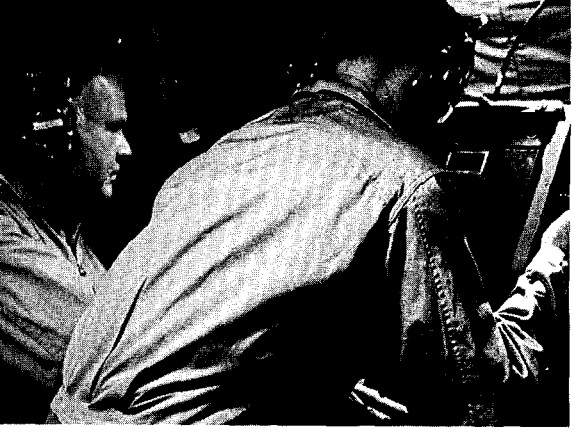
Below: B. Carl Lyon, as usual on overseas operations, went native and was gorgeous in a variety of lava lavas.



Above: Sandia launch crew prepares Nike-Tomahawk on Rarotonga. LASL instrument package was in nose cone.



Left: "Rube Goldberg" teammates, Bill Ogle, Donald Liebenberg and Walter Wolff tune up the complicated apparatus for multiple observations of the eclipsed sun.



Top: Al Graves and Sidney Stone align 40-inch focal length coronal cameras.

Merits of a "drinking nut" savored by Donald Liebenberg.

Eclipse

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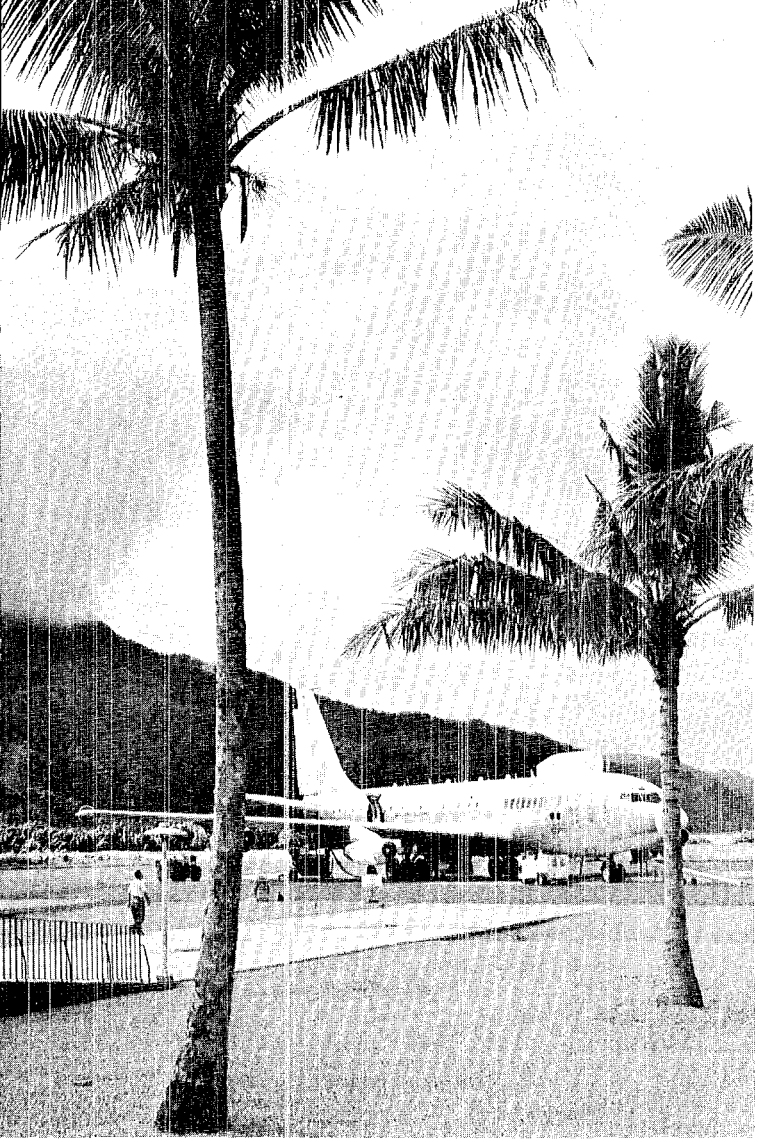
40,000 feet to avoid cirrus clouds extending to 37,000 feet. Interception of the eastward speeding shadow of the moon occurred at 9:59 a.m. local time at a point 82 miles from Bellingshausen Island, 1050 nautical miles ENE of American Samoa.

Just a moment after the last rays of the sun flashed through the canyons and mountains of the moon, night came at mid-morning; the pearly glow of the sun's coronal halo flamed in all its glory; and the stars appeared. The red rim of the chromosphere, two, and then three, bright orange-red spikes of solar prominences could be plainly seen through optical viewing systems. Close examination of the corona showed form other than just a glowing light. Wispy streamers and curving lines of radiance bending in toward solar poles were observed through telephoto lenses. Above the sun, Jupiter and Venus gleamed brightly in a dark blue-black sky. Four minutes and 47 seconds later, the brilliant flash of sun rays called the "Diamond Ring" signalled the end of totality as the corona disappeared.

Above: Captain Steve Pocsik, first navigator, was responsible for the practically pin-point positioning of the LASL flying laboratory for the eclipse flight.

Right: From the labors of many came success, as mirrored in the smiling faces of the LASL NC 135 eclipse crew on return from the sun run of May 30.



Above: Ralph Partridge makes a note in ice that collected on wing of aircraft during cosmic ray studies.

Left: Tafuna Airport in American Samoa was base for solar eclipse observers from Los Alamos and Sandia.

Ubiquitous ATOM was represented by Bill Regan, who doubled as historian and photographer. Airborne "office" was in forward latrine of NC 135.

Utilities Overhaul

Large sections of the Los Alamos residential and commercial community are taking on the look of a devastated area. For months to come daily life for many will be punctuated by disturbances and perturbances not designed for those unpossessed of unwavering patience and equanimity.

But when the dust, holes, cuts, noise, detours and disruptions are ended, Los Alamos will be physically fit to face the future on its own, with completely new or rehabilitated utilities distribution systems.

Few indeed are the communities who will have had it so good. The Atomic Energy Commission is spending millions of dollars correcting original design and capacity deficiencies and replacing worn outdated facilities in the water, sewer, gas and electric systems, and making major improvements to principal streets. Then, when it's all done, the package will be turned over to the County, free of encumbrances.

"To accomplish all this with a minimum of shattered composure will require the cooperation and forbearance of everyone," said Charles C. Campbell, area manager for the AEC and the man ultimately responsible for the success of the Community Transfer Act, or "disposal" of the Los Alamos community into the hands of its occupants.

Campbell and his staff of project engineers felt enough concern over the possible reaction to the community commotion that's on the way that they outlined the plans and programs at a Laboratory colloquium last month. Campbell said there will be community construction activity for the rest of this year, through much of 1966 and possibly into 1967.

Water line rehabilitation will be done in two phases. Phase A will include correction and replacement of water service lines, primarily in the Western Area and at various locations in North Community. Undersize and corroded pipe will be replaced and a new meter and easily accessible stopbox will be installed at the curb line for each property. Each residential unit will have its own service lines, eliminating the need for easements and interconnections.

Phase B will include the correction of low pressure zones in North Community. This will be accomplished by readjustment of pressure zones, installing new loop lines, block valving and new and relocated pressure reducing valves. This phase will include a new supply line to North Mesa and Cumbres School to improve both supply and pressure, and a new fairway sprinkling system at the Golf Course. There also will be work correcting sewer line deficiencies for Cumbres School and the regrading of a segment of sewer main in the lower Walnut Street area.

Similar improvements will be provided in the various commercial areas of Los Alamos, including fire protection water storage.

Since supplying water, though not distributing it, will remain an AEC function after disposal, another project will be installation of "master meters" to assure a measure of how much water is wholesaled into the community.

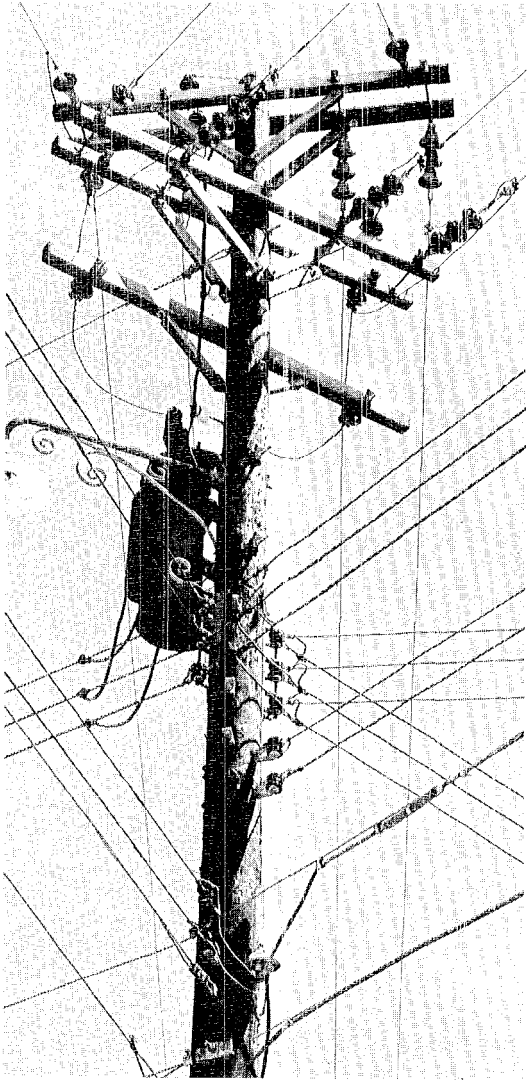
Some of the gas distribution system rehabilitation has already been accomplished, especially in the Western Area and in the area north from Orange Street to the 18 B houses. The work remaining is underway now. Included is the replacement of corroded mains, new valving, and relocation of low-pressure piping at houses. This involves installing some new steel pipe and "sleeving" other lines with a heavy polyethlyene plastic pipe.

In all the water, sewer and gas line work it will be necessary to make cuts in both the street and in yards. Some of these excavations will be minor—new techniques make it possible to dig and work with trenches that are only a few inches wide—but others will require big holes in the ground. During these periods it probably will be impossible to park or even drive on some neighborhood streets.

AEC and the Zia Company have promised restoration of all yards and turf that are removed because of ditch-digging and have urged tenants to report failure to restore lawns.

The new hookups will also mean occasional interruptions in service. These will be kept as brief as possible and never will exceed four hours in length and, the AEC says, will not come without at least 24 hours warning and usually 48 hours advance notice.

While all this work is going on at the surface and underground, there will be more activity over-



New power poles and transformers and a modernizing of the electrical distribution system will be an above-ground activity during the community's "season of disruption."

head. Power poles that have deteriorated will be replaced and anchored. New and additional transformers will be placed in the primary circuits to update the power supply system for modern requirements.

The electrical rehabilitation work will be complicated somewhat because all overhead utilities in Los Alamos are strung on a common pole network. That is, primary and secondary electric lines, the fire alarm and telephone cables and regular phone lines are suspended one above the other from the same poles. This means that as new wires or poles are installed, care must be taken to not disturb these other services or to interrupt them as little as possible. It also means that it will not be possible to do much realignment of pole routes. Provision is being made, however, to re-route all primary power lines that heretofore passed over residential buildings.

Major street work will be on Diamond Drive, which will be widened to four lanes between Sandia Drive and Thirty-fifth Street. Included will be the addition of a fourth lane on the "fill" between Western Area and North Community and a reduction in the street grade by the Baptist Church from the present 11 per cent to 2 per cent. An effort will be made to give one-lane access to the churches in the construction zone but general traffic will be routed around the work for several weeks.

Also on Diamond new traffic signals incorporating computer-directed operation will be erected between West Jemez Road and Urban Street.

Another major road project is scheduled in the Technical Area, affecting White Rock and some outlying tech site commuters. The present 12 per cent, double S-curve drop into Pajarito Canyon will be replaced with a 7 per cent grade with easier curves. Pajarito Road between TA-51 and TA-18 will be closed for at least a month and traffic will be routed over the South Mesa Access (East Jemez) Road.

Officials urge parents to be watchful of children during construction in the neighborhood. There will be heavy equipment, many unprotected and unexpected holes in the ground and always the possible hazard of live wires getting loose. And for mutual protection, residents are asked to keep track of their dogs while equipment and strangers are likely to be passing through yards.

There are reasons for having all this work going on at once, Campbell explained. One is the decision to have the county own the gas and electric distribution systems and the AEC's determination to put the systems in first-class condition before turning them over to the county. Had the decision been to sell to private firms they would have gone on an "as is" basis.

Before any of the actual construction could begin there had to be platting of new property lines, determination of which units would be sold, which multiple units would be converted for single unit ownership, and surveys and searches had to be made to find where each existing line was located and then plans drawn for the new lines.

And through all this, dead ahead on the calendar is September 1967, the time the community transfer legislation sets as deadline for the switchover of utilities and municipal installations.

By "transfer time," Campbell said, the AEC will have spent a total of more than $14,000,000 on new facilities for the Los Alamos community, including new schools, streets, sewage treatment facilities and the work now in progress. When one considers the amount of local tax money and bond issues that would be necessary to accomplish the same thing unaided, the convulsions of the moment are minor.

But in the meantime, if you're the type who is upset by confusion and chaos it might be well to pack up and take that l-o-n-g vacation. Los Alamos may not be your calm cup of tea for a while.

The Technical Side

AIAA Propulsion Joint Specialists Conference, Colorado Springs, Colo. June 14-18: (CLASSIFIED MEETING)

"Kiwi Transient Nuclear Test" by C. A. Fenstermacher, J-18, L. D. P. King, DIR-RFS, and W. R. Stratton, N-2.

"Improved Performance of W-Based-UO_2 Fuel Elements" by William H. Lenz, CMB-6.

"Critical Mass Measurements for Various Fuel Configurations in the LASL D_2O Reflected Cavity Reactor" by C. C. Byers and G. A. Jarvis, both N-2.

"Analysis of the Kiwi-TNT Excursion and its Relation to Rover Reactor Accident Predictions" by W. R. Stratton, P. M. Altomare, and D. M. Peterson, all N-2; C. A. Fenstermacher, J-18, and L. D. P. King, DIR-RFS.

"Some Neutronic Results of the Kiwi-B-4E Nevada Test" by E. A. Plassmann, H. H. Helmick, and J. D. Orndoff, all N-2.

"The Los Alamos Coupled Kiwi-B-4 Experiments" by C. G. Chezem, H. H. Helmick, both N-2, and R. Seale, Consultant.

"The Stability and Temperature Dependent Kinetics of Coupled Nuclear Rocket Engines" by R. Seale, consultant, and C. G. Chezem, N-2.

"Reactor Run Profile—Kiwi-B-4E" by J. D. Balcomb, N-4.

"Measurement of the Power-to-Core Temperature Transfer Function of Kiwi-B-4E" by J. D. Balcomb, N-4.

"Ground Test Radiation Experience at the Kiwi-B-4E Tests" by R. E. Malenfant and G. A. Graves, both N-2.

"Current Rover Protective Technology at Los Alamos Scientific Laboratory" by D. C. Winburn and M. G. Bowman, both CMB-3.

"Disassembly and Post-Mortem Observations on the Kiwi-B-4E Reactor" by A. R. Driesner, N-1.

"Uranium Load Measurements in Rover Type Fuel Elements by the Gamma-Counting Technique" by B. L. Blanks, GMX-1.

"Measurement of Niobium Carbide Coating Thickness of Rover Type Fuel Elements by the Beta-Backscatter Method" by B. L. Blanks, GMX-1.

"A Replica Technique for the Inspection of Rover Type Fuel Element NbC-Coated Surfaces" by T. G. Gregory, GMX-1.

"Examination of Rover Type Fuel Element Components by Electron Microscopy" by T. G. Gregory, GMX-1.

"High Temperature Reactor Core Thermocouple Experiments" by W. R. Prince and W. L. Sibbitt, both N-7.

"A Study of Power Density and Thermal Stress Limitations of Rover Reactor Fuel Elements" by W. R. Prince, J. C. Rowley, and R. G. Gido, all N-7.

"The Kiwi-B-4E-301 Full-Power Tests: Systems Performance and Data Analysis" by D. W. Brown, H. R. England, and J. A. McClary, all N-7.

"Description of the Design and Testing of Kiwi-B-4E-301 Propulsion Reactor" by V. L. Zeigner, N-3.

"Stress Analysis and Static Testing of Kiwi Graphite Reflector Cylinder Structures" by J. W. Neudecker, N-7.

"The Kiwi and Phoebus Development Programs" by R. E. Schreiber, DIR-OFF. (INVITED PAPER)

Sixteenth Annual Meeting of the Tissue Culture Association, Miami Beach, Fla., May 31-June 4:

"Sialic Acid of Cells in Culture as a Function of Cell Size" by Paul M. Kraemer, H-4.

National Meeting of Society for Industrial and Applied Mathematics, Courant Institute, New York City, June 7-9:

"A Note on Numerical Methods of Polynominal Solving" by Zane C. Motteler, T-1.

Seminar at Office of Naval Research, Silver Spring, Md., June 8:

"Results from a Numerical Method Applied to the Time Dependent Navier Stokes Equations" by Jacob E. Fromm, T-3.

Meeting of Commission I of the International Institute of Refrigeration, Grenoble, France, June 8-11:
*** **See additional two papers**

"Heat Transfer in Missiles and Space Operations" by Keith Boyer, J-DO.

"Critical Phenomena in Fluids" by E. F. Hammel, CMF-9.

SNPO Pressure Instrumentation Review Meeting, Large, Pa., June 9-10: (CLASSIFIED MEETING)

"Pressure Measurement Methods for Phoebus-1A" by G. P. Watts, N-4.

*** "Liquid Hydrogen in Nuclear Rocket Testing" by Frederick J. Edeskuty, CMF-9.

*** "The Generation of Oscillations Having Acoustic Properties in Forced Convective Heat Transfer to Cryogens" by Rodney S. Thurston, N-4.

Presentation at Carnegie Institute of Technology, Pittsburgh, Pa., April 21-23:

"Optimizing Zoom Systems with the LASL Lens Design Program" by Charles A. Lehman, T-5.

Presentation at Seminar at the University of New Mexico, Albuquerque, May 21:

"Approximate Solutions to the Nonlinear Reactor Kinetic Equations Using Taylor Series Expansions, Part I, II, and III" by John C. Vigil, K-1.

Dale Carnegie Alumni Association Division 24 Convention, Phoenix, Ariz., May 22:

"Fuel of the Future" by Edward M. Little, P-15.

Presentation at New Mexico Military Affiliate Radio System Meeting, Roswell, May 22:

"Rf System for a Meson Factory" by Joseph R. Parker, P-11.

International Federation of Information Processing Congress, New York City, May 26:

"Analysis of Inherent Errors in Matrix Decomposition Using Unnormalized Arithmetic" by Nicholas C. Metropolis, T-DO Consultant.

Meeting of Los Alamos Chapter, American Society of Metals, Los Alamos, May 26:

"Material Requirements for Nuclear Rockets" by Donald P. MacMillan, N-1.

Presentation at Linfield Alumni Banquet, McMinnville, Oregon, May 29:

"Putting the Atom to Work" by R. E. Schreiber, DIR-OFF.

Presentation at Summer Science Seminar, Los Alamos High School, June 10-11:

"Vapor Pressure—Its Determination and Significance" by W. M. Olson, CMF-5.

Eighth Annual Transformation Meeting, Wind River Ranch, Estes Park, Colo., June 14-16:

"Penetration of Infectious Phage λ-DNA into E. coli K12" by B. J. Barnhart, H-4.

Presentation at Symposium on Molecular Structure and Spectroscopy, Ohio State University, Columbus, June 14-17:

"ν_3 Band of $^{15}N_2\ ^{18}O$" by James Griggs and K. Narahari Rao, Ohio State Univ., and L. H. Jones, CMF-4.

"ν_3 of Boron Trifluoride" by Sister Noel Dreska and K. Narahari Rao, Ohio State Univ., and L. H. Jones, CMF-4.

"Calculation of Asymmetric Rotor Energies—Application to $H_2\ ^{16}O$ and $H_2\ ^{18}O$" by Phillip E. Fraley and K. Narahari Rao, Ohio State Univ., and L. H. Jones, CMF-4.

American Nuclear Society Meeting, Remote Systems Technology Div., Grenoble, France, June 15-18:

"Methods Used in the United States Hot Laboratories for Transferring Materials Through Gamma and Alpha-Gamma Barriers" by John W. Schulte, CMB-14.

Integrated Contractors' Meeting, Bendix Corp., Kansas City, Mo., June 16-17: (CLASSIFIED MEETING)

"Electron Beam Welding of 17-4PH Stainless Steel and Uranium" by Donald J. Sanstrom, CMB-6.

Presentation at North Glenn Colorado Kiwanis Club, Denver, Colo., June 17:

"Project Rover" by D. C. Winburn, CMB-2.

High Temperature Chemistry Conference, University of Kansas, Lawrence, June 17-18:

"Neutron-Diffraction Studies of Refractory Carbides" by Allen L. Bowman, CMB-3.

"Phase Diagrams and the Thermodynamics of High Melting Materials" by John D. Farr, CMB-3.

"A Study of Some of the Parameters Affecting Knudsen Effusion" by John W. Ward, CMF-5.

"Survey of Present and Future Work" by William M. Olson, CMF-5.

Presentation at Summer Science Seminar, Los Alamos High School, June 20-24:

"Temperature and States of Matter (Phase Diagrams)" by Frank W. Clinard, CMF-5.

Presentation at Seminar, Sandia Corp., Albuquerque, N.M., June 15:

"Rock Melting as a Drilling Technique" by D. E. Armstrong, J. S. Coleman, B. B. McInteer, R. M. Potter and E. S. Robinson, all CMF-4.

IFAC Symposium on Automatic Control in the Peaceful Uses of Space, Stavanger, Norway, June 21-24:

"Automatic Startup for Nuclear Reactor Rocket Engines" by B. G. Strait, N-4.

Eleventh Annual Meeting of the American Nuclear Society, Gatlinburg, Tenn., June 21-24:

"The Behavior of Coated Particles in a Large Nuclear Transient (KIWI-TNT)" by W. U. Geer, N-2; C. G. Hoffman and J. F. Kerrisk, both N-1.

"Application of Miniature Intrinsic Thermocouples for Reactor Transient Diagnostics" by R. G. Morrison, J-8.

"Analysis of the KIWI-TNT Experiment" by W. R. Stratton, N-2 and L. D. P. King, DIR-RFS.

"Description of the KIWI-TNT Excursion" by L. D. P. King, DIR-RFS.

"A New Technique for Testing Molten Plutonium Container Materials at High Temperature" by R. L. Andelin, K-2, A. R. Hawkins, K-3 and N. G. Wilson, K-1.

"Los Alamos Coupled Reactor Experiments" by H. H. Helmick, C. G. Chezem, both N-2; and R. L. Seale, consultant.

Detection of Plutonium Penetration Through Containers at High Temperatures" by Bill M. Moore, D. M. Holm, and H. M. Ruess, all K-1; and R. L. Andelin, K-2.

"Aerosol Characteristics of Burning Sodium and Plutonium" by H. J. Ettinger and W. D. Moss, both H-5; and H. M. Busey, K-DO.

"KIWI-TNT—Evaluation of Environmental Effects" by Harry S. Jordan, Robert V. Fultyn, Richard W. Henderson, and Philip K. Lee, all H-8.

"Pin Technique for Displacement Measurements in KIWI-TNT" by Beverly Washburn, J-18 and Charles Hudson, EG&G, Santa Barbara, Calif.

"Capture to Fission Ratio Measurement Using a Nuclear Explosion Neutron Source" by B. C. Diven, P-3.

International Conference on the Physics of X Rays, Cornell University, Ithaca, N. Y., June 22-24:

"Plasma Sources of X Rays" by George A. Sawyer, P-15.

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Bob Krohn, who now is Alternate D-6 Group Leader, was among the contingent of scientists who went from Los Alamos to the desert near Alamogordo in July 1945 to test the first nuclear explosive. Krohn's duties included work with neutron detectors on the ground and in cannisters lofted by barrage balloons a few hundred yards from the device. After the fiery blast, balloons and tether had vanished. So had the cannisters. A few weeks ago, nearly 20 years later, Krohn returned to Trinity Site. Walking across the desert not far from Ground Zero, he spied a twisted object protruding from the ground. He kicked aside the sand and extracted a torn metal tube. It was a cannister, apparently ripped by the blast and driven into the ground, to be hidden until bared by erosion. A few moments later Krohn discovered another partially buried gray object. It was an aluminum box he had built to protect a detector that was pulled out by cable after the test. The box remains in the desert still, but the ravaged cannister Krohn brought back to Los Alamos. He will make it into a lamp base.

A special issue of THE ATOM, dated July 16, 1965, detailing the scientific work and the personal experiences of the people who built and tested the atomic bomb will be distributed to coincide with the twentieth anniversary of Trinity.

Tech Side...

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American Physical Society Meeting, New York City, June 23-25:

"Hartree-Fock Calculation for Finite Nuclei with Realistic Forces" by Andrew M. Lockett, II, T-9 and Arthur K. Kerman, *consultant*.

American Crystallographic Association Meeting, Gatlinburg, Tenn., June 27-July 2:

"The Crystal Structure of Benzotrifuroxane" by Howard H. Cady, GMX-2; and Allen C. Larson, Don T. Cromer, both CMF-5.

THE SURPRISE and wonderment on the faces of these Los Alamos girls was the prelude to a weekend none of them expected. They are members of Girl Scout Troop 159 who left home a few weeks ago in anticipation of a campout. What happened is told in a story and pictures on the following pages.

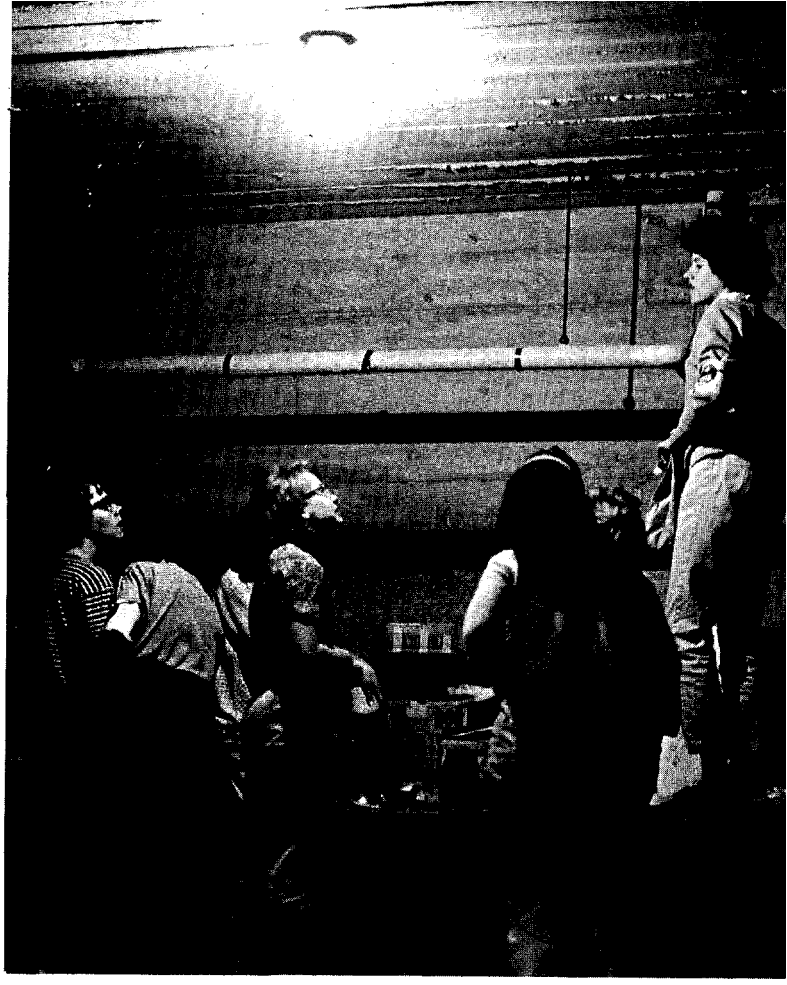
"At 3:30 p.m. we arrived at the shelter for an adventure challenging our ability to live with other people."

Jan Mosher, Kathy Wooten, Sherry Cadenhead, Barbara Jones, Beth Coulter.

Photos by Bill Jack Rodgers

Operation: CAMPOUT?

"The food is just plain terrible. I thought they were trying to keep us alive but the food makes you feel like they're trying to kill you or starve you or something."



Operating under sealed orders, 22 Los Alamos Girl Scouts, five adults and six children spent 26 hours in a fallout shelter here May 21 and 22 as a unique, surprise adventure in emergency preparedness.

The whole thing was a put-up job, arranged between the Girl Scout leaders and the Civil Defense organization as a dual-purpose exercise. Six of the girls were in charge, having accepted (blind) what the Girl Scouts call a "Challenge of Emergency Preparedness." These girls—Barbara Jones, Andrea Aragon, Jan Mosher, Beth Coulter, Kathy Wooten and Sherry Cadenhead—were given sealed orders early in the afternoon of May 21, not having known up to that time what their challenge was to be. Kathy Wooten was chosen by the group as Shelter Manager.

The rest of the girls, comprising nearly the entire roster of Troop 159, had been told they were going on a weekend campout in upper Guaje Canyon and came prepared for the outing. But when they gathered late in the afternoon on Friday, May 21, as directed, at the old North Community Fire House, now Civil Defense headquarters, they were ushered instead into the basement, there to remain for 26 hours.

Two families stayed in with them—Mr. and Mrs. James Coulter, and three children, Joan, Robert and Pamela; and Mr. and Mrs. Don Mosher and three children, Gail, Brian and Donna, the youngest of whom was only six. Mrs. John Wooten was the fifth adult present, representing County Civil Defense Director Robert Y. Porton.

They slept on the floor in their sleeping bags, ate the food stored in the shelter, slept a good deal,

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"Nobody seems bored. Everyone finds something to do—reading, hanging on the pipes or jumping rope."

Mary Westervelt

"Squealing, giggling and shouting gave way to setting up the shelter. Girls have a strong nesting instinct. They play house at the slightest provocation."

Kim Wallwork, Carol Hengstenberg, Peggy Deinken, Jean Wahman, Betsy Voorhees, Donna Durham, Connie King.

Neva Vogt and Jan Mosher.

"This is just like a huge slumber party."

Beth Coulter and Betsy Voorhees.

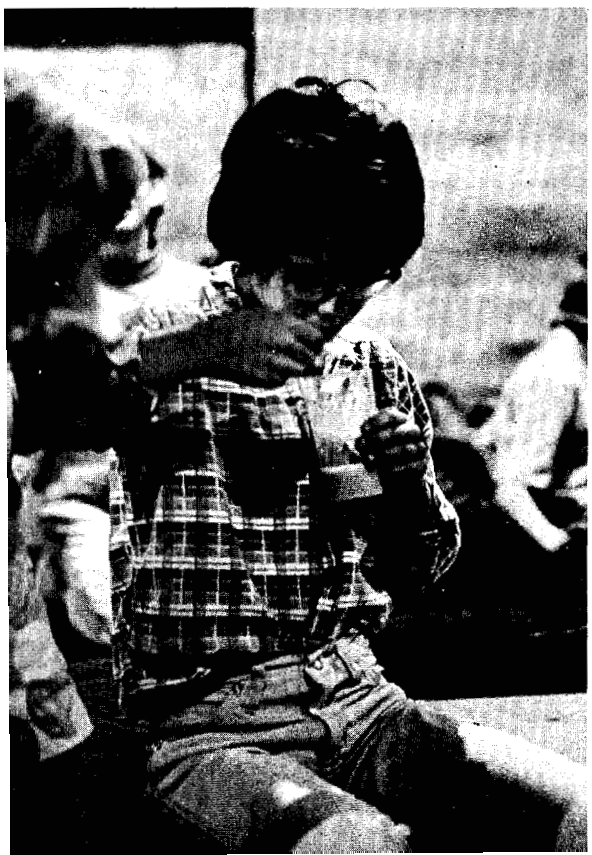
"Now it's quieter, and everyone is doing more gentle things."

"The food wasn't so bad this morning because I had milk with my sawdust."

Susan Jones.

"The same old stuff for lunch."

Beth Coulter and Sherry Cadenhead



played games, combed their hair—and afterwards agreed that while it was all a blast, they were glad it was over. The monotonous diet of crackers, MPF ("sawdust"), dried milk, and water, with a little carbohydrate candy thrown in, was the main cause of complaint.

A surprise addition to the proceedings was a visit by a reporter and a photographer from the Saturday Evening Post, who was in town to do an article on Los Alamos 20 years after Trinity. Toward the end of the ordeal Frank Tallmadge and Harry Craig of the Civil Defense Shelter Managers' Organization demonstrated radiation counters. Other contact with the outside world was by means of the shelter's shortwave radio equipment, relayed through the

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Jean Wahman, Lauri Waber, Betsy Voorhees

"The recreation had to be quiet, some people prefer to sleep."

Peggy Deinken.

"I'm having lots of fun just dreaming."

"It's nice to get a message over the radio now and then . . . it makes you feel like you aren't really shut in."

Mrs. James Coulter, Pam Coulter, Mrs. John Wooten.

Fire Alarm Headquarters. A message was exchanged with Karen Nilsson, member of the troop who was ill and unable to be present.

Impressions of the girls were recorded in diaries each of them was asked to keep. (Selections from the diaries are used here as captions for the photographs.)

Girls who took part, in addition to the "Challenge" group (who served as leaders and organizers) were: Carol Hengstenberg, Susan Jones, Jean Feber, Betsey Voorhees, Donna Durham, Jean Wahman, Neva Jean Vogt, Kathy Gibson, Lucia Cadenhead, Laurie Waber, Mary Westervelt, Jan Whitehead, Kim Wallwork, Peggy Deinken, Connie King and Diane Case.

More pictures on next page

"When we heard the photographers were coming, everybody ran and combed their hair, etc."

Jean Feber and Diane Case

Charles Harbutt (New York City)

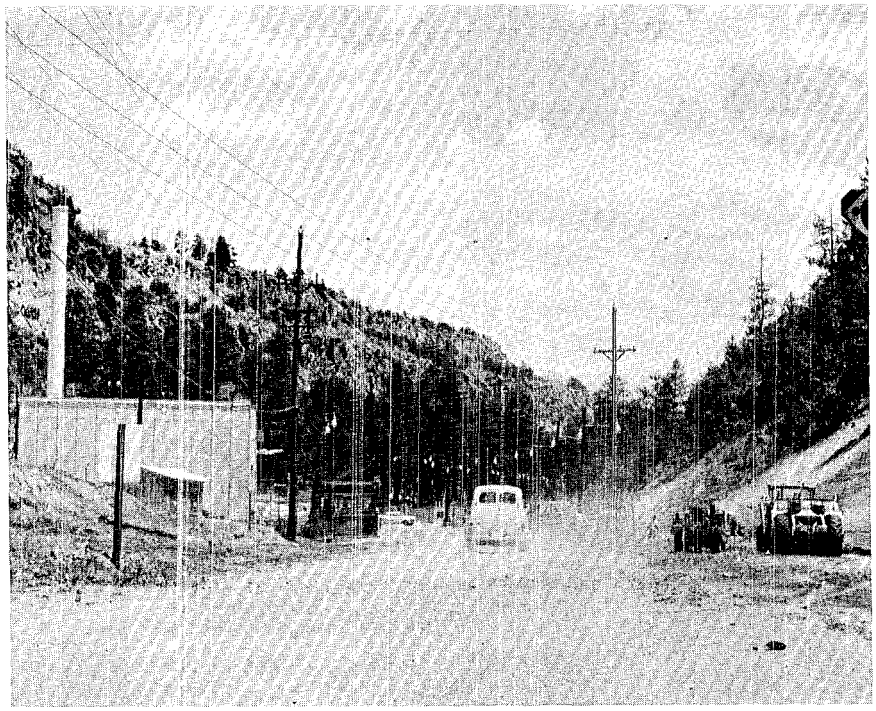
"Guess what!" The Saturday Evening Post is taking pix!"

"Kathy just announced that it was time to start cleaning up. Can't wait until it's time to go. Haven't seen sunlight for about 25 hours."

Peggy Deinken

"It was a blast. Never had so much fun in my life, but I wouldn't want to do it every weekend."

Mrs. Don Mosher, Andrea Aragon, Donna Mosher, Kathy Gibson, Betsy Voorhees, Mary Westervelt, Diane Case



Deep in Los Alamos Canyon a new road this summer cuts the security fence bondage that has restricted access to the Laboratory's oldest operating technical site, TA-2. Better known as Omega Site, TA-2 is the location of the Omega West and Water Boiler reactors and was the home of now-dead Clementine, the world's first fast neutron reactor. The new road bypasses W Site (TA-41), which remains very much a security area, by following a path built along the base of the south canyon wall. Visitors to Omega Site previously had to pass badge inspection to travel the road through W Site. Photo shows new road construction at right squeezing past W Site. Although the security restrictions have been lifted, P-Division officials stress that Omega Site will be open only to authorized visitors who have made prior arrangements to enter.

For Reporting Change of Address

Previous Address

If your address has changed please inform THE ATOM by clipping and filling out this coupon. Print or type your name and both your old and new addresses.
Mail to: Mail and Records, Addressograph
Los Alamos Scientific Laboratory
Box 1663
Los Alamos, N.M. 87544

name

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city state zip code

New Address

address

city state zip code

WHAT'S DOING

FAMILY DAYS: July 17 and 18. Most facilities of the Laboratory, AEC, Zia Company and County will be open to visitors from 9 a.m. to 5 p.m. (MDT). Bus tours from Administration Building. Tour Guide Booklets available at technical sites and at Information Stations located at Highway 4 "Y," Old East Gate, Old South Mesa Access (Truck Route) Gate, Old West Gate, AP Building and Administration Building.

FILM SOCIETY: Civic Auditorium. Film shown 7 and 9:30 p.m. Admission by season ticket or 90 cents single admission.

Wednesday, July 21, "High and Low," Japanese thriller. 142 minutes.

OUTDOOR ASSOCIATION: No charge; open to the public. Contact leader for information on specific hikes.

Thursday, July 1, evening hike. Tom Watson, leader.

Thursday, July 8, evening hike. Betty Hansbury, leader.

Sunday, July 11, San Leonardo Lakes. Ken Ewing, leader.

Thursday, July 15, evening hike. Liz Gittings, leader.

Thursday, July 22, evening hike. Barbara Skaggs, leader.

Saturday, July 24, Truchas Peaks. Joint trip with the Mountaineers to one of the most beautiful areas near here. Those who wish may go only as far as the "amphitheater." Ken Ewing, leader.

Thursday, July 29, evening hike. Marlene McKee, leader.

EXHIBITION: Oil paintings by Edie King of Nambe and Los Alamos and metal sculpture by Chilton Gregory of Albuquerque. Los Alamos Building and Loan Assso-ciation Building, June 27 through July 17. No charge.

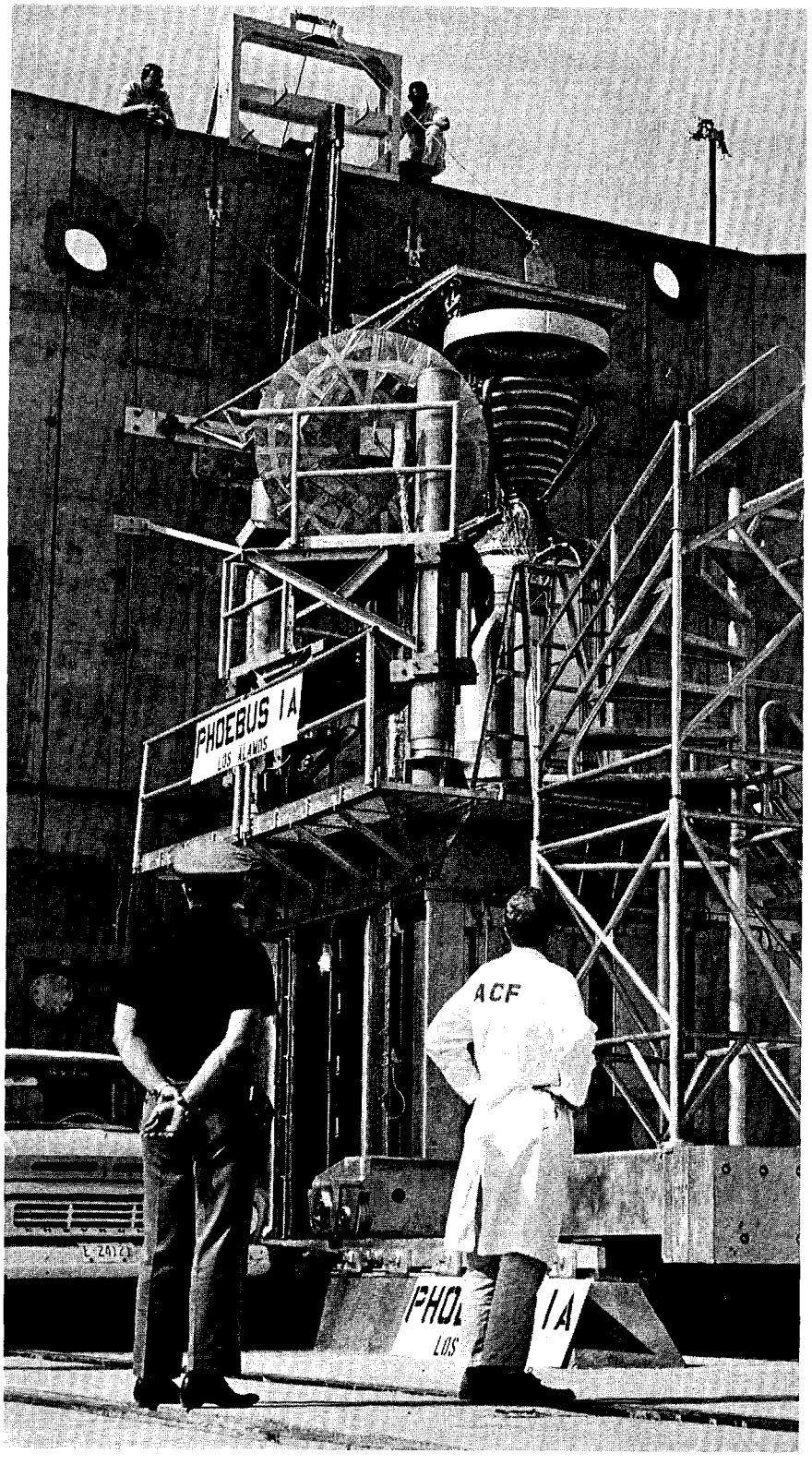
SOAP BOX DERBY: Central Avenue east from Fifteenth Street, 11 a.m. July 10. Sponsored locally by Junior Chamber of Commerce. No charge.

YOUTH OPERA LECTURES: Open to the public, no charge, sponsored by Los Alamos Opera Guild and Los Alamos Schools Music Department. Pajarito School Auditorium.

Thursday, July 1, "Madame Butterfly," lecture by Mrs. John Northrop, 7 p.m.

Sunday, August 8, "The Nose," lecture by Mrs. Leon Heller, 7:30 p.m.

Sunday, August 15, "Marriage of Figaro," lecture by Mrs. Donald Hagerman, 7 p.m.



No, that's not another Kiwi at Test Cell C: it's a Phoebus, which looks like a Kiwi. Phoebus 1A is the start of new Project Rover reactor series.

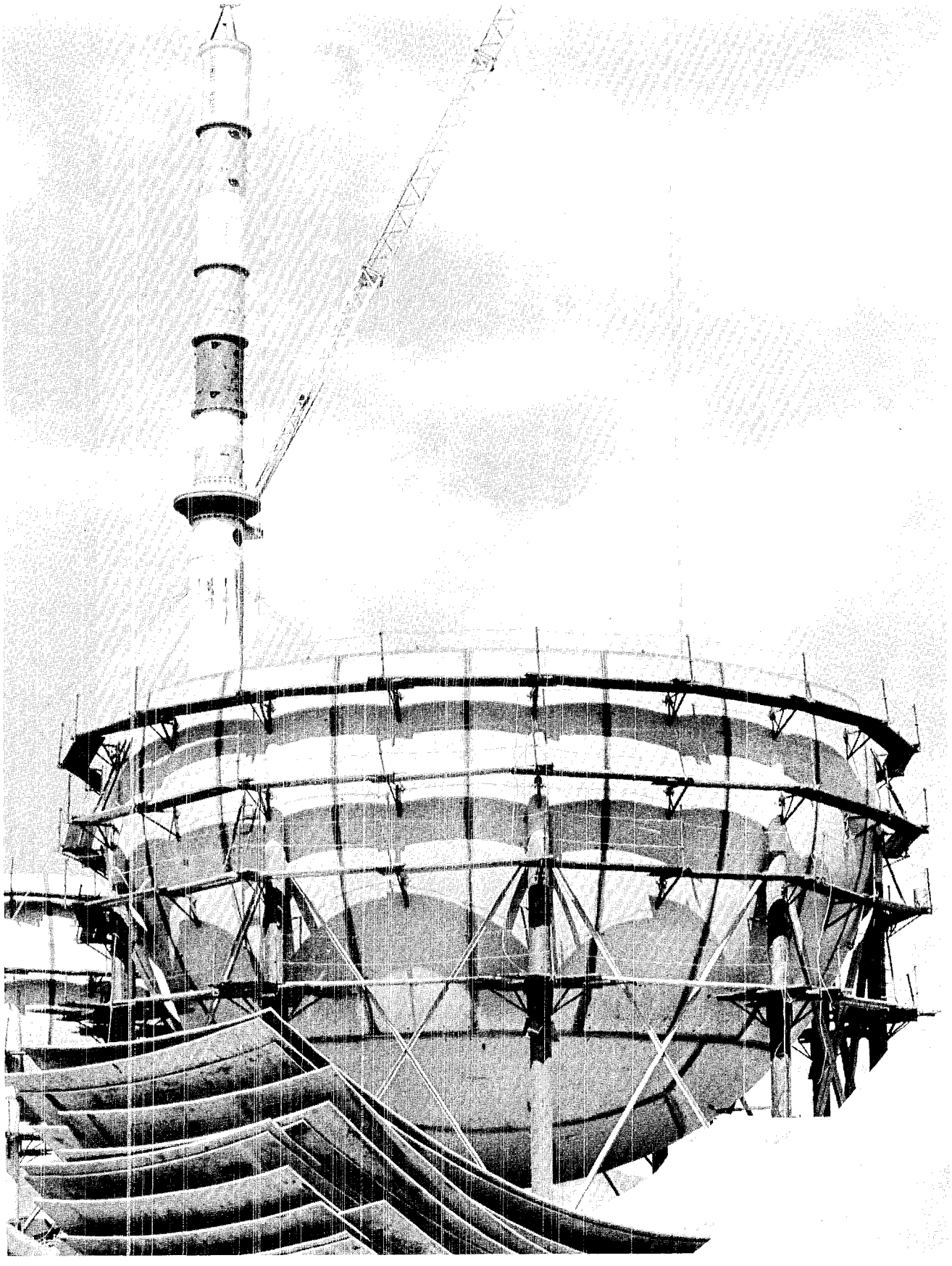
Tests of LASL's Phoebus-1A nuclear rocket reactor at NRDS this summer are the beginning of a series of experiments which will lead to the larger, more powerful Phoebus-2, which is scheduled for testing in 1967.

Phoebus-1A, used to study a scheme which might be suitable for flight control in space, has the approximate size and shape of LASL's Kiwi-B-type reactors, but with those changes needed to study a more advanced nuclear rocket system which will have long life, high temperature, and the lowest possible overall weight. Modifications which prove advantageous will be incorporated into the Phoebus-2.

The last Kiwi reactor, Kiwi-B4-E, was operated at full power and temperature on August 28, 1964, and successfully restarted September 10. Phoebus-2 is being designed to operate at a power level of 500 megawatts (a megawatt is a million watts) with a thrust of 250,000 pounds, five times as powerful as the last Kiwi and the first NERVA (Nuclear Engine for Rocket Vehicle Application) reactors.

Phoebus-1B will be tested in the spring of 1966, and it is planned to operate it in the power range of 2000 megawatts. Later in 1966, LASL plans to test Phoebus-1C whose purpose is to explore higher temperature operation.

Opposite: 500,000-gallon liquid hydrogen storage tanks like this one now under construction at NRDS, will be installed at LASL's Test Cell "C" as part of program to upgrade the facility and increase its capacity for testing Phoebus reactors at higher power levels and for longer duration. Recent work at the test cell also included the installation of three 28,000-gallon liquid nitrogen Dewars for phobus use.



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